

THE IRON AGE

New York, March 6, 1924

ESTABLISHED 1855

VOL. 113, No. 10.

Production of Perforated Metalware

Routing of Materials and Special Punching Arrangements

Features of Hendrick Plant—Steel and Manganese

Bronze the Principal Materials

WITH a large portion of its product going to the coal industry, the Hendrick Mfg. Co., Carbon-dale, Pa., has developed methods of producing screens and gratings for that industry which will avoid in large measure clogging with dust and small particles of coal, and consequently the deterioration of the materials which follows such clogging. In addition, screens for sand, gravel, crushed stone and filter presses are manufactured; in fact, screens for everything that has to be sized are made here, and a special type of screen which is milled instead of punched, and which is used for sewage disposal plants. The company makes these

various screens from sheet and plate steel, copper, manganese bronze, monel metal, brass and other alloyed metals. One of the problems is in the disposal of the punchings and trimmings from the steel plates and sheets used, which amounts to a considerable quantity. These form splendid material for electric furnace use but are difficult to handle.

Extensive alterations in the layout, started about four years ago, have been just about completed. These alterations were made necessary by the growth through the past half century of a plant started as a small unit and added to from time to time as demand for its

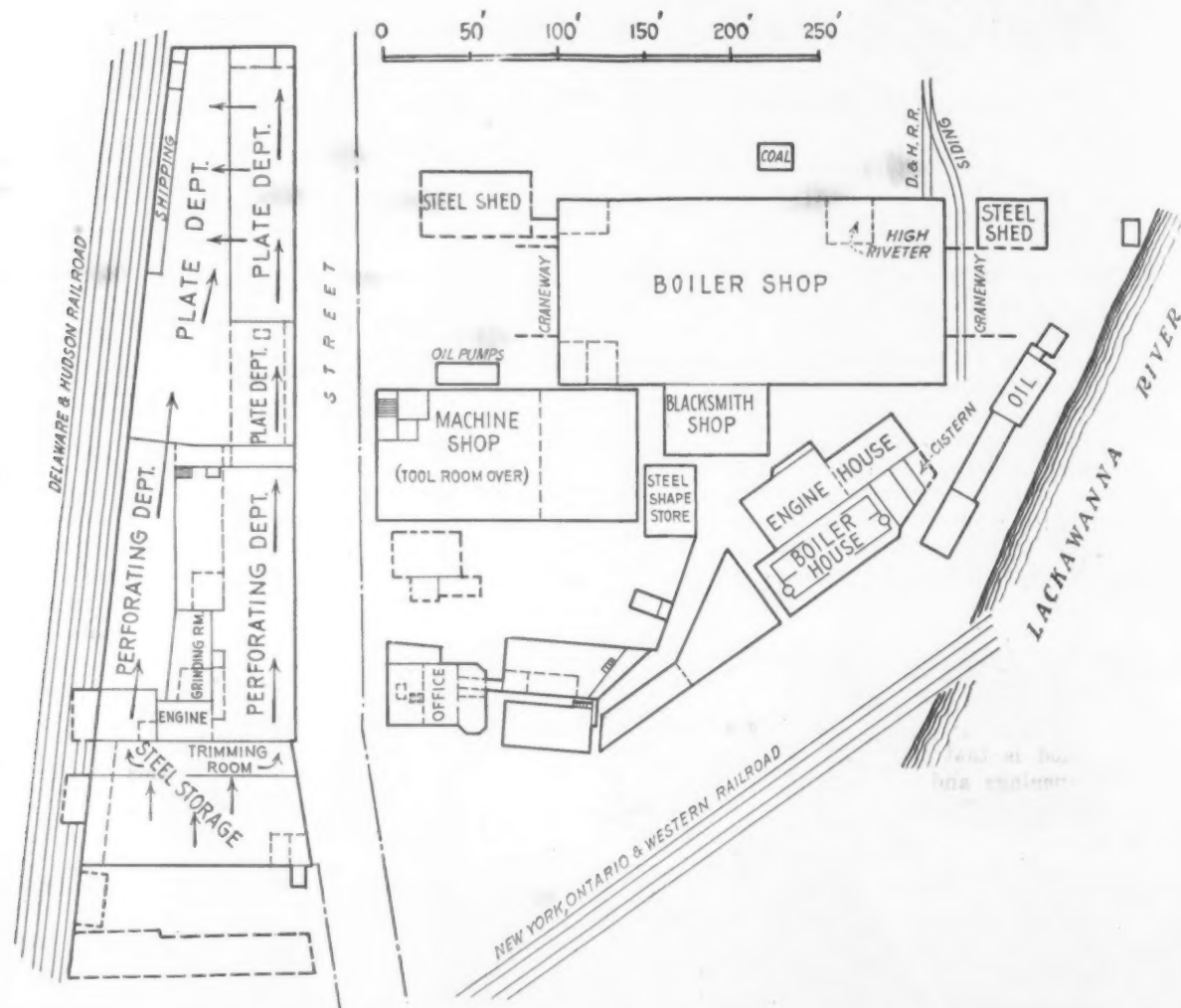


Samples of Work, Showing Plane Flanged Screens and Curved Screens (Upper Left), Tapered Curved Screens (Right), Pressed Gratings (Bottom) and Riveted Skip Car (Center)

products increased. It is located on both sides of the street and is limited in growth by a railroad right-of-way at one side, a small river at the other side, another railroad right-of-way at one end and private property at the other end. Consequently most of the land available for use has already been built upon. In the rearrangement, however, particular attention has been paid to the economy to be obtained from straight-line routing of materials.

As is indicated in the diagram of the works, the plates and sheets forming the raw material are brought in on a siding of the Delaware & Hudson Railroad. Plates and heavy sheets are unloaded from the cars by

diversity in the uses of the product. Holes as small as 0.027 in. diameter or as large as 8½ in. diameter are punched. In addition to this there are other shapes, including very thin slots, punched for special purposes, some of these latter being about 1/64 in. in width by ½ in. long. The great bulk of the work, of course, requires holes between 1/16 in. and 1 in. in diameter, although there is a good deal of plate going through with 2-in. or larger holes. The machines on which this work is done are principally of Bliss or Hilles & Jones make. In some cases they have been specially arranged by their manufacturers to suit the conditions of the work. In other cases they have been partially re-



Movement of Material Through the Perforating and Plate Departments to the Shipping Platform Is Indicated by Arrows in the Buildings at Left of Street. Dotted lines in lower left corner show a building, recently acquired but not yet occupied, which will be used for steel storage. Tank, stock and other riveted work, such as skip and mine cars, are done in the boiler shop. Here, also, the pressed steel gratings are fabricated

magnets suspended from cranes, two crane runways being extended out over the spur for this purpose. In both cases, of course, the end of the building consists of huge doors which may be opened to permit the passage of the crane. Material brought in in box cars—the thin sheets—have to be unloaded by hand. In either case, however, they are brought into the storage shed, where they are classified, and all except the largest area pieces are put into racks.

From the raw material storage sheets and plates are carried on hand-pushed industrial cars on a narrow-gauge track into the trimming room, where they are trimmed to size. Here are four shears, the heaviest of which can handle ¾-in. steel. Trimmed sheets are then advanced into the press rooms and punched in accordance with whatever order they may be called upon to fill.

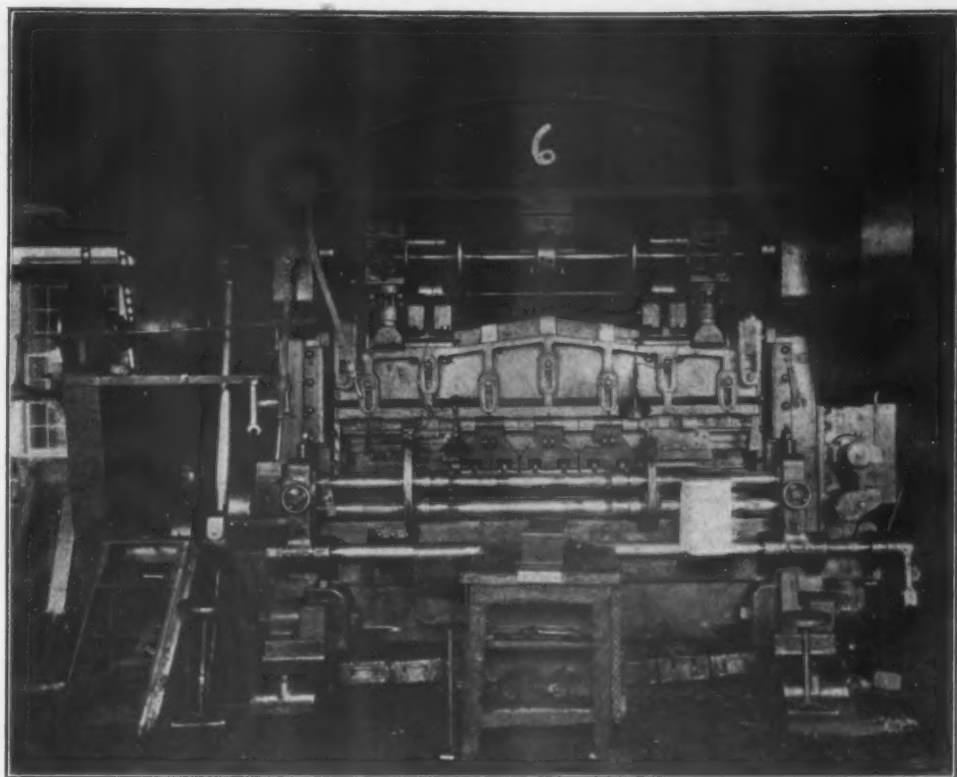
There is great diversity in the punching, due to the

modeled, particularly as to details of control, in the Hendrick plant. They range for the most part from 75 to 600 tons capacity.

Most of the work is punched so cleanly that there is no burr left on the lower side of the sheet, but if burred surfaces are required, plates can be finished in this manner. It is inevitable, however, that the stresses in the metal set up by the operation of punching warp the material slightly out of shape. For this reason, straightening rolls are used to bring it back into shape, in addition to the bending rolls required for certain grades of work, particularly with rotary screens.

By far the greater tonnage of punch work is handled in automatic machines, in which the feed is produced by setting the machine and depending upon the positive action of its elements to advance the sheets a required amount after each stroke. Certain special work, however, particularly where the punching has

Three-Hundred Ton Perforating Press Fitted with Combined Feed and Side-Shift Motion to Perform Punching Such as That Detailed in Fig. 2. The feed mechanism, at left, operates after every down stroke; the sideways shifting motion, at right, after every downward stroke but in alternate directions after alternate strokes. The long connecting rod at left is swiveled at its top to permit its automatic adjustment to the shift motion



to be irregular, as in tapered sheets, is controlled by hand, both as to feed and as to location of the punched holes.

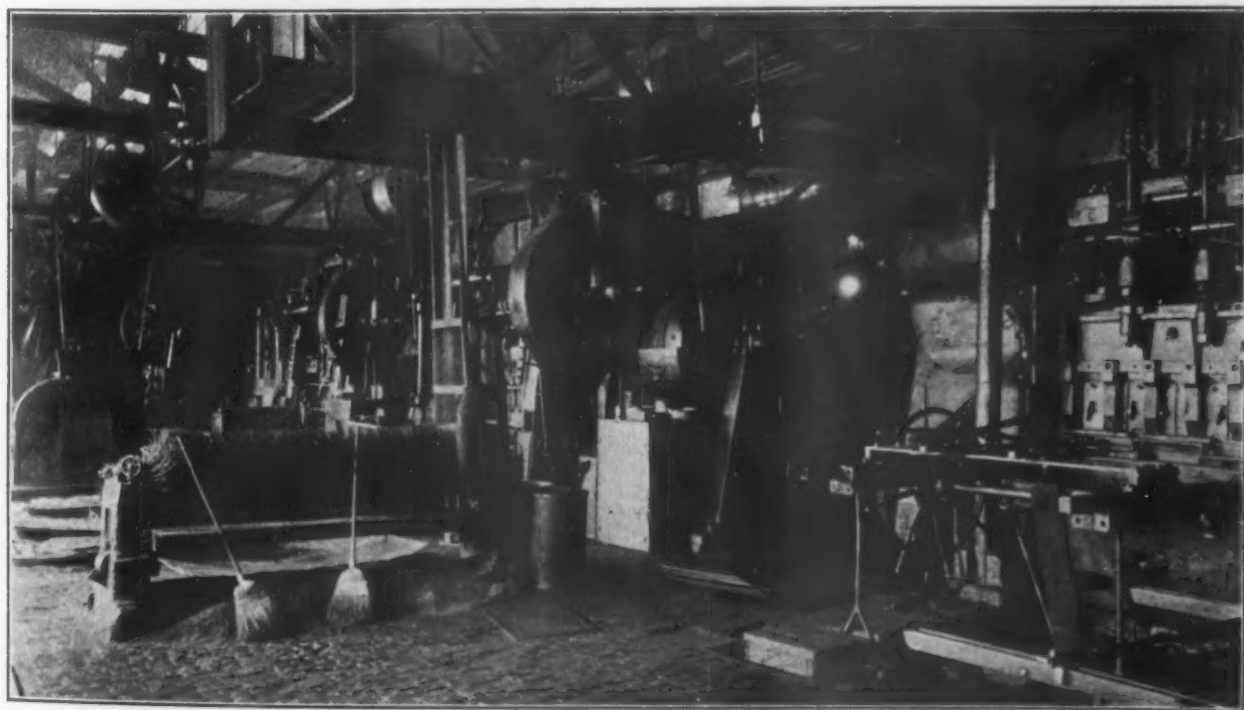
One of the most interesting cases of feed is that of a 300-ton punch press which, on the occasion of the writer's visit, was punching holes about 2 in. sq. with rounded corners in plates $\frac{1}{2}$ in. thick. These holes were spaced with about $\frac{1}{2}$ in. clear metal between them and were staggered. (Fig. 2.)

Pressed Grating

Another form of grating produced by a totally different method is that used for coverings, footways, etc., over openings and intended largely for ventilation and lighting. Typical of this type is that which

is used over the subway in some of the New York side-walks. Other gratings of this type are used for covering mine shafts, for flooring in galleries, in mine breakers and power plants, and in many other similar locations. These are made of narrow strips of steel forced into intimate interlocking contact under a hydraulic press. The process is patented. The principle of transforming the prepared joint into the completed lock is indicated in Fig. 4.

It will be noted that the metal in the intersecting members in the prepared joint extends slightly above the level of the main members and that there is a dovetail opening at its lower end, this dovetail being a portion of the slot cut in the heavy member to re-



Multiple Punch Presses with Hand Feed, Governed by the "Steering Wheel" Shown at Left Side of the Right-Hand Machine. At left is the dusting roll, to remove the sawdust thrown on the plates for the purpose of absorbing the excess of oil used for lubrication

ceive the secondary member. The action of the press forces the soft steel of this secondary member to flow into the dovetail, in process of being pressed down with its top level with that of the main member. The dotted line shows the lower half of the secondary member between main members, both pieces being slotted to suit the conditions. These gratings are made in a number of types, varying from 13/16 in. centers in both directions to 13/16 x 4 1/4 in. centers. In the latter case, either the heavy member or the light mem-

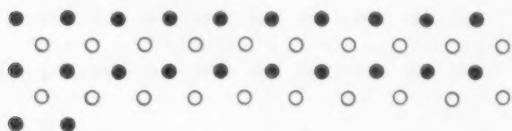


Fig. 1—Multiple Punching of Holes, Where Two Non-Adjacent Rows Are Punched Simultaneously, Then the Intervening Rows, Also in Pairs. In this case the feed of the sheet or plate through the press is the distance between adjacent rows, while, at the same time, there is a sideways movement equivalent to half the pitch of adjacent holes. There may be 50 or more holes in a row and 50 or more rows in a sheet

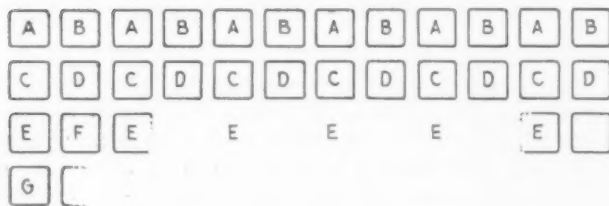


Fig. 2—Multiple Punching, One Row at a Time, Where "Every Other" Hole Is Punched at One Stroke and the Intervening Holes at the Next. In this case the feed of the plate through the machine operates only after each second stroke, while a sideways movement occurs, equal to the pitch between adjacent holes, after each stroke. Thus, all the holes marked A are punched, then those marked B, then C, etc.

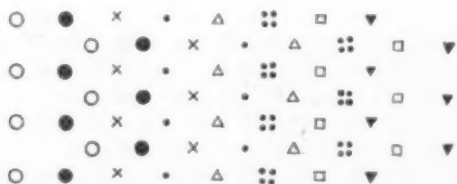


Fig. 3—Multiple Punching by Groups of Holes on a Machine of Limited Power. In this case the punching is carried across the width of the sheet (left to right in our cut), and then the sheet is fed through the machine a distance equal to the width of the band of holes already punched, and the process is repeated. In the set-up shown, seven holes are punched simultaneously—first the seven shown by our symbols as hollow circles, then the seven solid circles, followed by the crosses, the dots, triangles, etc.

ber may take the longer spacing, according to the length of span and supporting power required. A special form of this same type has been developed for gratings which have to be crossed by heavy loads, such as automobile trucks. This larger size will take comfortably as much as 6 tons per wheel, with a 4-ft. span.

Special Work Under Way

There is a certain amount of special work going on in the plant, including boiler breechings, steel stacks, tanks, skip cars, riveted steel elevator buckets of

various types, etc. Mine car bodies, including those for very low level work, are made of pressed metal with either riveted or welded connections.

One of the special products, which is patented, consists of a stepped screen for colliery use, which gives better action of the coal in its screening process than is obtained with a straight plate. This improved action is due to the fact that the small steps accelerate the motion of the coal and keep it from piling up and clogging.

Naturally, in a plant of this character the tool room is of vast importance. Dies and punches are made here and are kept in repair. Dies are reground as to the plane surface after each run in the machines and the punches are ground as often as needful. A small heat treating room is used for giving the tools

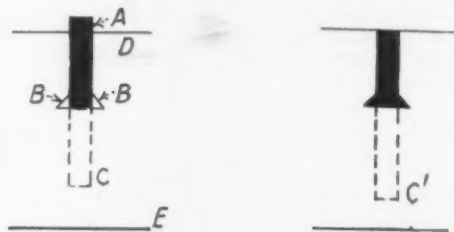


Fig. 4—In the First View, the Cross Piece A C Projects Above the Stringer D E. On being forced down so that A is level with D (second view) the metal in the lower part of the black area shown in the cross piece is forced into the dovetail cuts B B in the slot in the stringer. The bottom of the cross piece C naturally goes to C', this movement being equal to the initial projection of A above D. This makes a thoroughly rigid connection without rivets or welding and is done cold on a hydraulic press

their final quality, a Leeds & Northrup automatically controlled furnace being one of the features.

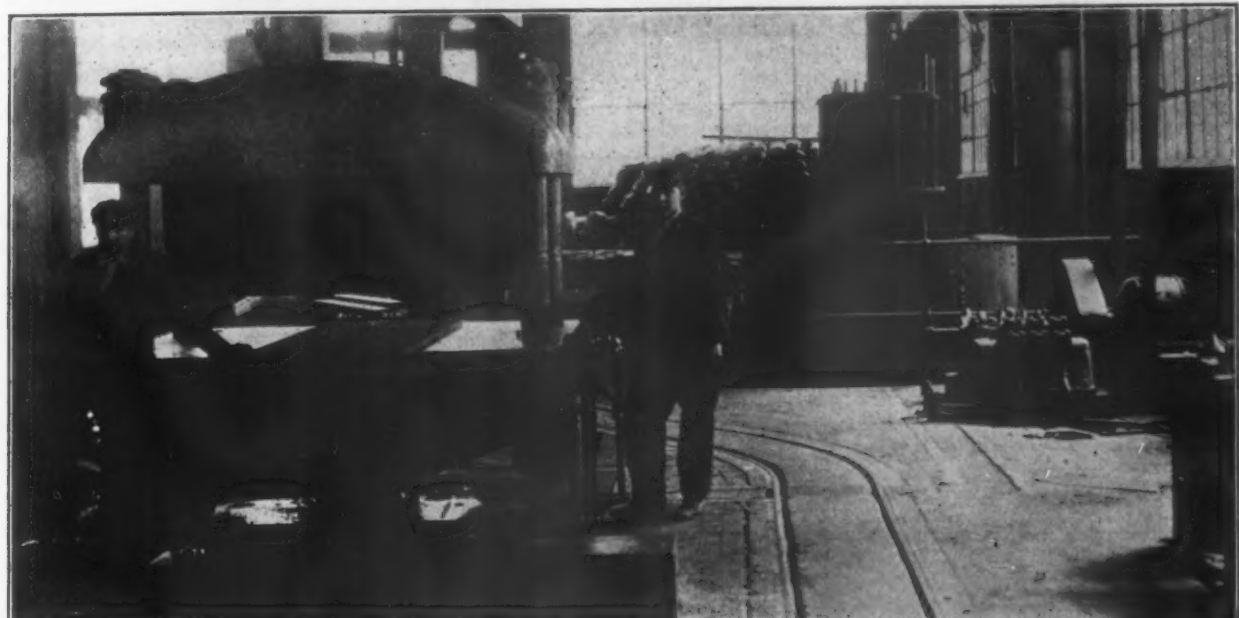
Much of the material which comes in has to be annealed, particularly if it is to take heavy bending. This is a commercial proposition, because deep stamping steels can be obtained which will not require annealing. The ordinary customer, however, will not pay the price for such material. The annealing, therefore, is a safety measure costing much less than the higher grade of material and giving the same ultimate result.

J. T. Fulton, Pittsburgh office, Ingersoll-Rand Co., was the speaker at the mid-winter meeting of the Eastern States Blast Furnace and Coke Oven Association, held at the William Penn Hotel, Pittsburgh, Thursday evening, Feb. 21. His subject was "The Use of Turbo Blowers for Blast Furnaces." The speaker kept close to his text and avoided the controversial phase of other types of blast furnace blowing engines. Next meeting of the association will be a joint gathering with the Chicago association of blast furnace and coke plant men. This meeting will probably be held at Cleveland.

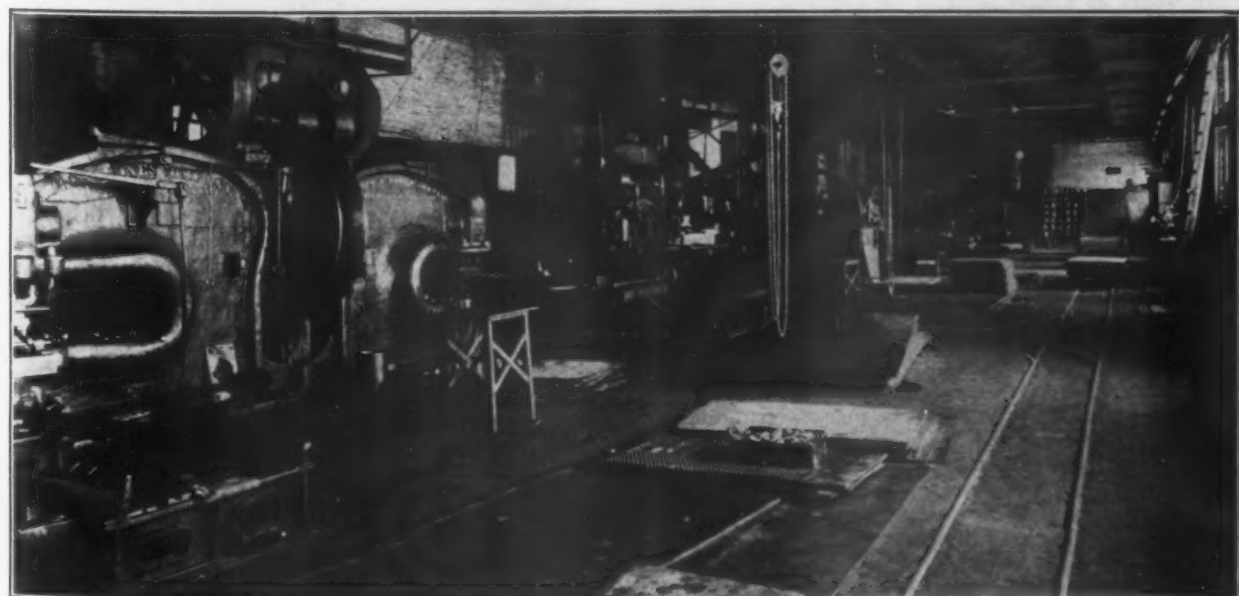
An address on "Mechanical versus Hand Molding," illustrated by stereopticon views, will be delivered by Frederick K. Vial, chief engineer Griffin Wheel Co., Chicago, at the next meeting of the Chicago Foundrymen's Club at the City Club, Chicago, Monday evening, March 10. Mr. Vial supervised the construction and equipment of the Council Bluffs plant of the Griffin company, where practically all operations are handled mechanically, as described in an illustrated article in THE IRON AGE on March 30, and April 6, 1922.



To Straighten Plates Warped by the Punching Process They Are Passed Through a Set of Straightening Rolls (Right Center)



Hydraulic Press Used for Making the Patented Joint of the Mitchell-Tappen Co. Grating. This is done by several successive "bites" of a few inches each, until the entire area is done. In rear are an accumulator and motor-driven pump



Perforating Presses and Gate Shears Designed for Various Types of Punching and Trimming Work, with Overhead Tramrail for Handling Heavy Plates. Material comes into the shop on flat cars running on the narrow-gage track. The section of track in left foreground, elevated slightly above the floor, carries a car on which the plate is manipulated in the punching process, which is done in single holes or a small number of simultaneous holes, as required. The type of car is shown just beyond the second punching machine

MORE IMMIGRATION BILLS

Senator Reed Would Encourage Immigration— Committee Reports Bill

WASHINGTON, March 4.—The Senate Committee on Immigration last week reported out a bill proposing to continue 1910 as the base year on which to determine quotas of immigrants, but providing for a reduction from 3 to 2 per cent. The House bill, strongly sponsored by Chairman Johnson of the Committee on Immigration, would change the base year to 1890 and is designed to give encouragement to heavier immigration of Nordic races. Senator Colt, chairman of the Senate Committee on Immigration, is opposed to both measures and has filed a minority report to the Senate bill in which he protests against the proposed reduction in the quota percentage. Senator David A. Reed, of Pennsylvania, has introduced a measure which carries some unusual features. It takes the Johnson House bill as a foundation, but instead of fixing 1890, as the Johnson bill does, as the year on which arbitrarily to base quotas, the bill of Senator Reed combines the censuses of 1910 and 1920. This is done so as to discover what nationalities already by their record in the United States prove to be the most easily assimilable into American citizenship. It is thus not an attempt to discriminate against so-called undesirable nationalities or other countries themselves, but is plainly designed as a discrimination against immigrants from any country whose coming to America is purely a commercial enterprise. It is directed against those who enter this country, work and make money, and, declining to become citizens, return to their native land without having contributed to the United States anything but their physical efforts.

In other words, they are the dross in the melting pot which, from the point of citizenship, is to be cast off as being not only of no good to the United States, but of distinct harm. Senator Reed realizes the need of labor by industries of the country, but maintains that much more important is the need of immigrants who will enter into American life and constitute themselves a part of its citizenship.

Some Would Be a Menace

The view is constantly gaining ground that many of the tremendous numbers of would-be immigrants to the United States would be a serious menace to the country and, because of radical ideas and utter lack of respect for constituted government, would also be a vast danger to the employing interests of the country. By comparison, it has been pointed out, a labor shortage would be a mild thing in its effect.

The bill introduced by Senator Reed does not fix an arbitrary quota percentage. It provides that the annual minimum quota of any nationality shall be 200 as does the Johnson bill, and in addition 1 per cent of the number of foreign born individuals living in the United States as determined by the 1910 census. It further is provided that when it shall have appeared by the census of 1920 that more than half of the foreign born residents in the United States had become naturalized, there shall be added to the quota of such a nationality an additional 4 per cent based on the census of 1910.

The theory back of the Reed bill is that there cannot be any forced naturalization of immigrants but that alien colonies in the United States, given to the use of foreign tongues and maintaining purely foreign interests, are un-American and a danger to the Republic. The Reed measure is intended to encourage immigrants to become Americanized in fact as well as by more legal formality, and would particularly encourage immigration from Nordic countries, including the United Kingdom, Germany and the Scandinavian area—Sweden, Norway and Denmark.

Secretary Davis' Bill

Senator Watson, of Indiana, and Senator Moses, of New Hampshire, also have introduced an immigration bill, which makes three measures of this kind now be-

fore Congress. It was prepared by Secretary of Labor Davis, and proposes a 2 per cent quota, as against the existing 3 per cent quota based upon the census of 1910. One of the principal sections of the bill would authorize the Secretary of Labor, under certain conditions, to suspend restriction as to certain kinds of labor, a provision which many employers have urged be adopted to meet labor conditions.

By this arrangement it is provided that where a petition is filed in behalf of skilled or unskilled labor which cannot be found unemployed in the United States, and where a strike or lockout does not exist in the particular industry seeking to import such labor, the Secretary can remove the restriction as to this class of labor. It would be permitted to come in to meet industrial requirements.

Another provision of this bill would empower the President, upon recommendation of the Secretaries of Labor and Commerce, to proclaim a total suspension of immigration from certain countries, either to continental or insular parts of the United States, on the ground of unemployment of labor in such regions.

These and other features undoubtedly will be the subject of a great amount of heated discussion and injected into it will be arguments on behalf of organized labor. Organized labor is strongly urging more restrictive immigration laws and it is believed it will oppose the provision of the Watson-Moses bill which would authorize the Secretary of Labor to suspend the restrictions under the condition noted.

Iron and Steel Imports Falling Off

Department of Commerce reports show that in January only 26,675 gross tons of iron and steel products entered the United States. Except for last No-

Imports of Iron and Steel in Gross Tons
(Monthly Averages)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl.	26,505	†14,132	.....	.....
1914 to 1918, incl.	23,351	4,645	3,281	‡47,155
1919 to 1921, incl.	23,901	5,708	3,710	37,115
1922	59,545	31,954	9,117	31,204
January, 1923	120,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	36,371	7,221	14,071
May	75,885	39,764	10,482	12,734
June	68,019	30,033	12,794	36,138
Six months' average...	85,964	49,706	8,980	13,535
July	53,464	19,760	12,381	23,824
August	45,439	14,564	7,334	23,026
September	36,611	8,353	9,744	35,175
October	29,882	9,349	9,372	16,842
November	26,364	9,299	5,073	14,790
December	27,009	12,355	2,307	12,003
Twelve months' average	61,217	30,652	8,343	17,171
January, 1924	26,675	10,587	3,033	23,081

*Not included in "total imports."

†Includes ferroalloys.

‡Average for three years, 1916 to 1918 only.

ember, with 26,364 tons, this is the lowest figure in twenty months, May, 1922, having shown 23,093 tons. The January total is less than one-half the 61,217-ton average month of 1923 or the 59,545-ton average of 1922. It is, however, substantially higher than the average month of the 13-year period from 1909 to 1921 inclusive.

The suit of the United States vs. the Nashville Industrial Corporation in which the government sought to set aside the contract of sale of the Old Hickory Powder Plant at Old Hickory, Tenn., on allegations of fraud, was dismissed by a decree entered in the Federal Court at Nashville, Feb. 23. Admission was made by the Government that no fraud had been practised by the Nashville Industrial Corporation. The industrialization of Old Hickory is now reported well under way with many buildings suitable for immediate occupancy.

Plans for Industrial Mobilization

United States Government Proposes to Profit by Experience of World War—Effort to Be Made to Prevent Profiteering and Other Abuses

BY L. W. MOFFETT

WASHINGTON, March 3.—Almost fatally unprepared when it entered the World War, the United States is seeking to profit from this bitter experience and has adopted an extensive and scientific plan of industrial mobilization. There are yet details to be worked out, but the general scheme has been completed. It has reached a point where Washington may figuratively press a button and send to every mine and manufacturing plant of the country the word and immediately convert them and their personnel into a vast war machine. No less an authority than Gen. John J. Pershing, in a recent review of "Industrial America in the World War," by Grosvenor B. Clarkson, has declared that delays in reaching quantity industrial production incident "to our condition of unpreparedness were almost fatal to the cause."

Whatever it may have failed to comprehend and to learn from the war experience, Congress at least partly grasped the lesson of industrial preparedness and in the National Defense act of 1920 made the Assistant Secretary of War responsible for planning industrial mobilization. With this legislative framework set up, the War Department has mapped out detailed plans and become associated with every industry of the country either directly or indirectly. The tremendous importance of the iron and steel and cognate industries to industrial mobilization is so obvious that it does not call for comment. The plans for using these and other industries, which embrace the entire producing fabric of the country, provide much interest and value.

As pointed out by Assistant Secretary of War Dwight F. Davis, the first step in planning is to determine how many men will be used in the Army and the rate at which they will be taken from industry. The General Staff supplies the man-power program. In order to be on the safe side, a major emergency is assumed somewhat similar in scope to the World War. The War and Navy Departments are cooperating so that the plan will be adopted as one.

Schedule of Requirements

Based upon the General Staff program, the seven procuring services of the War Department have made

up a schedule of requirements, which constitutes a bill of materials. Requirements are the initial equipment of troops, plus the estimated consumption, less the reserve stocks on hand. They must be figured for some 700,000 items, and on this task 50 officers were engaged about a year. In order that industry may plan a corresponding schedule of production, requirements are figured month by month for the first two years of the war. Computing primary requirements is strictly a War Department job. The next step is to divide these requirements among individual manufacturers in such a way that every item in the entire schedule will be obtained when needed, without asking of any single plant more than it can do. This task is well under way. It means a survey of the production capacity of some 10,000 plants.

Contact with so many manufacturers can be obtained only by decentralizing the work. Accordingly, the United States has been divided into 14 procurement districts, with headquarters at such industrial centers as Pittsburgh, Boston, New York, Chicago and San Francisco. In time of war each procuring service of the War Department will be represented in each district. All the services have organized their procurement districts. At the present time the Ordnance Department has effected the most nearly complete organization. In each district this department has selected some prominent business man as chief. Each district chief has as an assistant a regular ordnance officer who gives his full time to the work. The other services are organizing along similar lines.

The program covers allocations, specifications, contracts, etc., and if another war comes the War Department can send out several thousand telegrams and every manufacturer who is to have a war order can go to his safe, take out his production schedule, plans and specifications, and a copy of his contract, and, as Assistant Secretary Davis puts it, "sign his name on the dotted line and begin work."

In Touch with Mr. Baruch

Assistant Secretary Davis has pointed out that those in charge of the preparedness work have been in per-

PATHS OF PEACE BEST FOR INDUSTRY

Col. James L. Walsh at the Meeting of Engineering Societies and the Army Ordnance Association in New York, Feb. 5, Said:

"THIS meeting here tonight has nothing to do with going to war. What we are interested in is achieving a state of industrial preparedness which will match our unrivalled man-power with adequate munition-power, so that our country will be secure from attack by any power or combination of powers. We are planning for peace—continued peace, and we think we have hit on a logical way to insure it. Not by the mere expression of a pious wish, but by commanding it. And we of industry in working for this end are really working for ourselves, because upon us will fall the heaviest burden if we are again caught unprepared industrially as we were in 1917. A great many people think that our participation in the World War was profitable for industry, but I doubt if there is a single corporation in existence today that would not be better off if there had been no war, and if we had been permitted to continue in the paths of peace."

sonal touch with Bernard M. Baruch, who was chairman of the War Industries Board, and hundreds of other leaders, both civil and military, whose experience in the World War is of value. The officials have made an effort to find out what things should be done and what avoided. As a result of this work, Mr. Davis said, a few things stand out clearly, but there is a great deal yet to be done and help is welcomed.

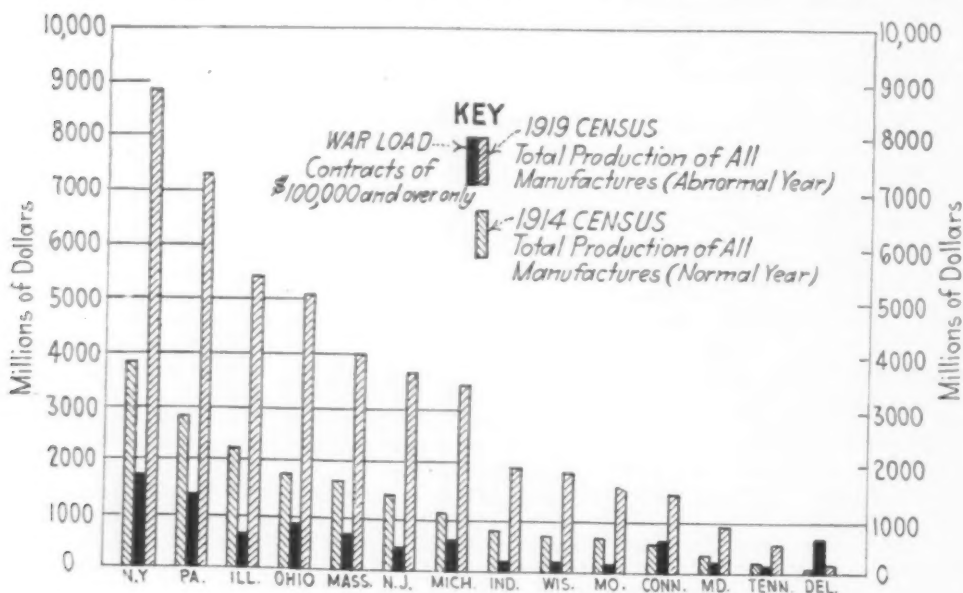
One of the first things, Mr. Davis said, that is being done covers specifications which must be prepared for many thousands of items. Where an article is of commercial type, the problem is simple. It is more difficult to prepare specifications for strictly military articles. In war, money is a minor consideration, but when raw materials are scarce and the time is short, the Army must ask for something that can be produced quickly and in quantity. Before military specifications are approved, they must be sent to manufacturers who can express an opinion from the production standpoint. All Army specifications are prepared in accordance with the rules, and under the auspices, of the American Engineering Standards Committee. Where possible, commercial standards are closely followed.

Power is an important element in war production.

to make careful and detailed study of each critical mineral and the department now has some of the reports, which promise to be as constructive a piece of work for national defense as has been accomplished since the Armistice. The question of getting raw materials is based upon experience of the World War and conditions operating at that time. Also the matter of raw materials was called to the attention of Congress during the discussion of the existing tariff law and the possible effect upon domestic resources of certain tariff schedules. The War Department merely stated the case to Congress without recommendations, the object in view being to call attention to the fact that certain raw materials, such as manganese ore, are practically exhausted in this country and that it would perhaps be a wise policy to arrange the tariff so as to encourage imports rather than encourage domestic production.

Emergency Reserves

The necessity of emergency reserves also is a vital matter. It has been pointed out that the reserve of any munition not regularly manufactured in peace should be sufficient to supply the mobilized fighting forces until such time as industry can get into production in neces-



There exists the problem as to whether the power in any locality will be adequate for the war manufacturing needs of that particular locality. A continuous power survey is being made by the officers of the Corps of Engineers in the river and harbor districts throughout the country. All of the technical information and advice is furnished by the personnel of the local power companies. Mr. Davis declared that if the proposed superpower plans are carried out, the national defense problem will be largely solved.

Pledge of Iron and Steel Institute

Declaring that other organizations, including trade associations, are studying their particular tasks, Mr. Davis said that the American Iron and Steel Institute, through its president, Chairman Elbert H. Gary of the United States Steel Corporation, has assured the Government of its full cooperation. Assistance will be obtained not only in problems of best use of peace-time products, but also concerning increased production of special kinds of steel. The Ordnance Department is in close touch with the American Society of Mechanical Engineers and the Society of Automotive Engineers, and will get valuable help from them.

The question of raw materials is another problem being studied. The United States is better supplied with raw materials than any other nation, Mr. Davis explained, but there are certain items in which this country is deficient and the deficiency is a serious problem. Some of the more important strategic materials are minerals, and as a result the War Department sought the aid of the American Institute of Mining and Metallurgical Engineers. Committees were appointed

sary quantities. In this connection, and as an example, the United States reserves of small arms ammunition and artillery ammunition, Army officers state, will soon decrease by deterioration and expenditures for training to that point where, unless the Government begins a program of annual replacement, they will not suffice to supply the troops until plants can get production started. Maj.-Gen. Clarence C. Williams, Chief of Ordnance, stated that the possible rate of mobilization will always be determined by the state of reserves and that from this point of view the next major war will be won or lost on the sufficiency of munition reserves. The Ordnance Department has reported that the most critical item for it will soon be small arms and artillery ammunition. The War Department is of the opinion that it is unlikely that Congress will ever consent to appropriate in time of peace sufficient money to maintain a war reserve which military men would like to have in order to insure a more rapid mobilization. Because of this, the department takes the position that there seems to be but one thing to do in connection with the ordnance problem, and that is to get sufficient appropriations to keep the art of manufacture alive. This will involve placing annually "educational" orders with selected facilities, furnishing manufacturers with the necessary jigs, dies, gages, etc., to encourage them to experiment under the flexible form of contract which will insure them against loss.

Taking up the matter of the cost of the supply program, Assistant Secretary Davis said that the War Department is giving most careful attention to the ways and means whereby profiteering may be controlled in time of war. He declared that the principle that the

men at home shall not profiteer while their fellows are staking their lives and their health for their country is fundamental as a proposition of common justice. Such a policy was affirmed in the nation-wide referendum by the Chamber of Commerce of the United States during the World War, and Mr. Davis said that the principle may be regarded as a fixed national policy for the future. With this end in view, contract forms have been prepared.

Forms for Wartime Use

The Board to Standardize War Contracts, consisting of one representative from each supply bureau of the War Department, has drafted three forms for wartime use, including the increased price contract for construction supplies, the cost contract for construction, and the cost contract for supplies. These are in addition to the procurement and requisition order forms and cost accounting regulations. The principal feature of the contract forms is the incorporation of provisions which are intended to insure fair treatment of the contractor while making it a matter of self-interest on his part to conserve the expenditure of public funds. They likewise are held to protect the interests of the United States and assure expeditious performance.

In placing war orders, there has been provided a single form of contract on which anything can be purchased for the War Department from pins to railroad locomotives, or anything manufactured, from shoes to railroad artillery. It has been designated "a fixed-price contract." By this it is meant that it is intended for use where prices can be accurately determined and agreed upon in advance of signing the contract. The other contract forms are of a flexible nature and will be necessary in the case of those things for which no experience exists to guide business men. Special attention has been given to the selection of properly qualified personnel of particular men for the inspection of products to see that they meet specifications accurately.

Procurement Planning

In order to deal logically with the problems which will rise in the economic phase of procurement planning, the department has considered this subject under six heads: (1) capital; (2) labor; (3) facilities; (4) raw materials; (5) power; (6) transportation. During war the flow of raw materials to the Army as finished products in the form of munitions is expedited by such additional means as allocations, priorities, conservation, etc.

With regard to capital, it is planned to set up some sort of agency to function as did the War Finance Corporation during the World War, for the purpose of assisting banks engaged in the production of munitions and also of setting up an organization like the War Credits Board, created by the Secretary of War, and which during the World War made advances of funds to contractors furnishing supplies. Going further, the department has in mind the drafting of capital or "taking the profit out of war."

The War Department claims that there are only four ways by which capital can be drafted. They are as follows, according to Assistant Secretary Davis:

"First, take money itself—this would be unnecessary since the Government already has the means of obtaining dollars by the issuing of bonds. Second, take over and operate plants. Authority to do this already exists in Section 120 of the National Defense act, but this is very poor policy because it merely adds an additional burden to the Government's troubles in time of war and would not result in greater efficiency. Putting men in jail and seizing their property do not stimulate production and that is what we want. Third, control prices. It is possible to do this within certain limits, but price-fixing is a very dangerous thing to undertake because, if prices are fixed at such a figure that industry cannot at least break even, they will prefer to surrender their facilities into the hands of the Government to operate. Fourth, take away excess profits. This was done during the World War and very successfully."

Control of Labor

The question of the control of labor is recognized as being a delicate one, and one which goes to the root of

our modern industrial life. It is the fear of rise in price of commodities that starts labor troubles just as it starts trouble with capital. It has been pointed out that there is an inevitable rise in prices in time of war caused by inflation, increased consumption, reckless buying, increased cost of production on account of scarcity of raw material and unskilled labor, high freight and insurance rates, increased taxation, hoarding of supplies and profiteering. So that everything possible might be done to prevent rise in prices, and hence unrest in labor and increased cost of production, Assistant Secretary Davis has approved the draft of a law designed to correct some of these matters and which has been adopted by the American Legion.

The measure has been introduced in Congress by Representative Johnson, of South Dakota, and provides that in case of war the President would be authorized to exercise control over material resources of the country through agencies then existing, or which he may create. He also would be authorized to take such steps as may be necessary "to stabilize prices of services and commodities required by the Government or by the civilian population." Assistant Secretary Davis declared that he knew of no legislation which would be so beneficial in controlling economic conditions as this program, but it is broad and therefore he doubts whether Congress would consent to vest such powers in the Chief Executive. Mr. Davis said that it is vital that machinery be set up promptly at the outbreak of war for adjusting labor disputes, with power to write real decisions. This was not finally accomplished during the World War until a year after the declaration of war, when the National War Labor Board was created.

To Avoid Congestion

It is also necessary, Mr. Davis said, that machinery be created for the purpose of insuring a proper distribution of labor, diverting it from non-essential to essential, and avoiding congestion as well as under-supply. This was done after August, 1918, by making use of the United States Employment Service.

Taking up the question of facilities, the industrial plans are built upon experience of the War Industries Board and include the work of the Conservation Division for the elimination of waste, so far as possible, standardization, requiring the use of wood containers instead of tin by substituting materials which were plentiful for those which were scarce, as for example, zinc for steel and other needed metals. The plan also goes extensively into the question of conversion of plants to a wartime basis.

In connection with the allocation of facilities, the plans take into account the critical industrial area of the United States. It is shown that 15 States during the World War produced more than 93 per cent of the total war program in money value. Of these States, eight lie northeast of the line drawn from Baltimore to Erie, Pa. The logic of necessity is forcing to the front the industrial capacity of the Mississippi Basin because the Northeast section of the United States is reaching the saturation point.

Other factors to be considered in allocating facilities provide for distribution of the war load as evenly as possible and allocations as near raw materials as possible, and the avoidance of creating new facilities unless existing requirements are inadequate.

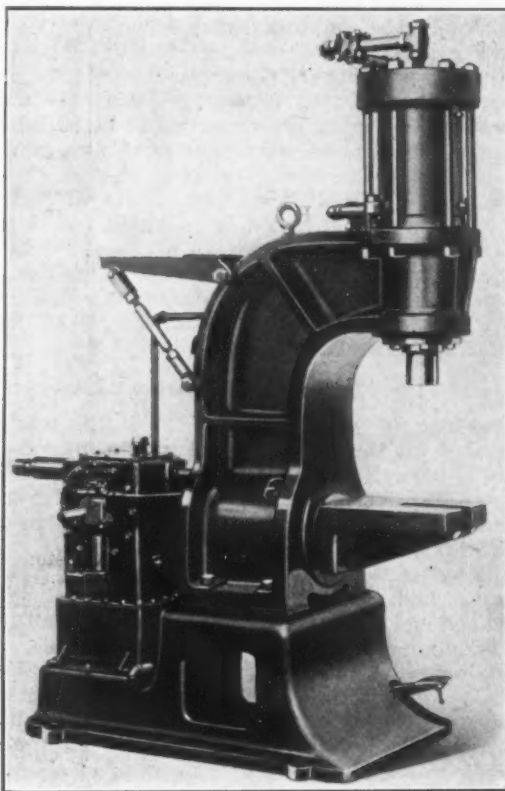
The War Department, of course, has given careful study to the all-important question of transportation. It is in touch with the Association of Railway Executives and in conjunction with the executives is preparing plans for transportation in time of war. Vivid recollection exists that during the World War the transportation situation was one prominent factor which limited industrial production.

The Columbia Steel Corporation, San Francisco, operating a plant at Pittsburg, Cal., and the Llewellyn Iron Works, Torrance, near Los Angeles, is disposing of a bond issue of \$1,000,000, a portion of the proceeds to be used for proposed extensions in properties, with equipment additions. W. E. Creed is president.

Quick-Acting Hydraulic Riveter

The hydraulic riveter illustrated is a recent addition to the line of the Oilgear Co., Milwaukee, and like the presses and broaching machines of this company, which have been previously described, the features emphasized are that the machine is self-contained, easy to locate anywhere on the shop floor, and may be driven from any constant-speed source of power.

The machine is equipped with the company's type WE constant-pressure pump, with which it is claimed that delay in waiting for pressure to build up is eliminated, the pressure being available the instant resistance is met. The pump is said to supply oil to the cylinder under steady pressure, free from pulsations and with instantly variable delivery from zero to maximum, its displacement being positive against any resistance up to the capacity of the machine. Control is by



Hydraulic Riveter With Constant-Pressure Pump

means of the foot treadle shown, an arrangement permitting the operator to use both hands in placing the work.

Setting rivets by the hydraulic method, subjecting each rivet to a quick squeeze, is claimed to be superior in that it permits the hot or cold metal to assume its new shape and make a uniform tight joint without undue stresses or fracture. The stroke is 4 in. and the design allows for placing the work so that the strokes may be limited to just clear the work on the up stroke or return to the ram. The horn shown on the machine illustrated is of special design to accommodate an indexing fixture. Removable horns of any design may be used. Two standard sizes of the riveter, 10 and 20-ton respectively, are available.

New High-Production Cutting Material

A high-production cutting metal known as Jolite, the base of which is high-speed steel, has been placed on the market by the Jolite Tool Co., Milwaukee. The principal property of the material is said to be the "red hard" cutting edge provided, the cold cutting edge holding up well until the necessary "red hardness" is reached.

The process of manufacture of the metal is claimed to be one that can be duplicated with precision, a uniform product resulting. The process hardens the steel throughout, and further treatment by the user is not

only unnecessary, but retreating is said to nullify the process.

Among advantages claimed for the metal are its strength and ability to maintain a keener cutting edge. The latter characteristic is pointed to as reducing the power necessary to drive the tool, and the additional strength provided permits of greater feeds and lesser speeds. The tool's resistance to wear is emphasized as aiding in holding the work to size. Formed cutters, including spiral hobs, of this material are said to give unusual results, and inserted tooth cutters are claimed to stand up to work on hard castings with a rake of 12 to 15 deg.

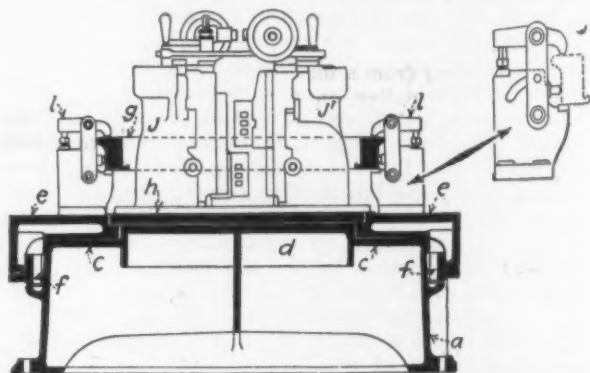
Tire Boring Machine of British Design

The accompanying illustration shows a machine recently built in Great Britain for the purpose of boring and recessing locomotive and car wheel tires varying from 36 in. to 84 in. in diameter.

The machine shown is driven by a variable speed motor, which has a 3 to 1 range and is mounted on a base plate attached to a planed face on the body. The actual drive, which is through an oil-cased worm and worm wheel, is finally transmitted to the internal spur wheel on the revolving table marked *f*.

The body *a* of the machine is circular and is cast with several stiffening ribs. The annular surface *c* is turned and has a center pivot *d* for the reception of the revolving table *e*, of which the internal spur wheel *f* forms a part. The table *e* carries the tire *g*. The upper center part of the body *h* is machined to take the two compound slide rests *j* and *j'*, these occupying the space inside the tire. The table *e* revolves on the circular flat face of *c*, being kept central by pivot *d*, adjustable pads being provided to take up any wear. The tire is held in position by dogs *l*, the design of which is shown in the sketch at the upper right of the illustration.

The tool slides have variable self-acting horizontal and vertical traverses with hand adjustment in both directions, and the rate of feed may be varied while the machine is running. The automatic feed motion pro-



Machine for Boring and Recessing 36 In. to 84 In. Tires

vides for five changes of feed in both directions, this being effected by means of disks and a ratchet wheel.

Two sets of gang cutters are employed normally with three tools each so arranged that the finishing tools follow in the path of the roughing tools for boring, cutting the recess and finishing the groove. This applies to the machining of tires fitted with "Mansell" rings. In the case of those fitted with "Gibson" rings there are only five tools, that is two finish boring tools for the two internal diameters, a tool for cutting the side groove in one box, a rough boring tool for the internal diameter and a tool for cutting out and finishing the bottom groove in the other one.

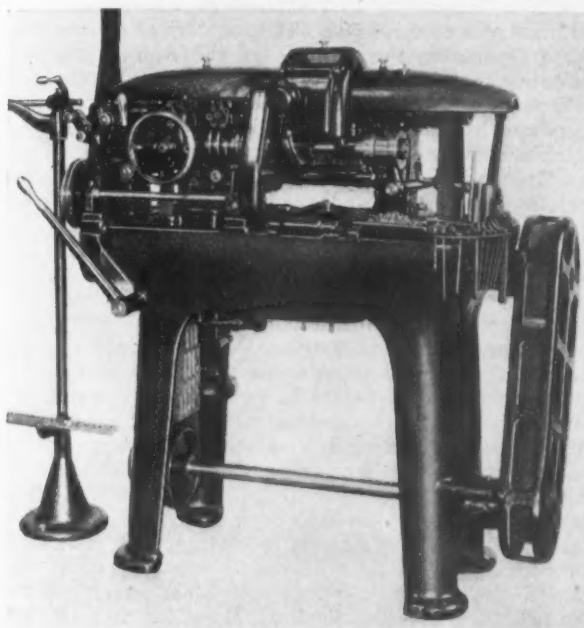
As stated, the drive is through worm and worm wheel. These revolve in an oil tank in the base of the machine. The shaft of the worm is vertical and it carries at its upper end the spur wheel which engages with wheel *f*. The worm shaft is fitted with oiling rings and has a ball thrust bearing. Oil is pumped from the tank to the slides and pivot.

The machine was built by Craven Brothers, Vauxhall Works, Reddish, Manchester, England.

Automatic Screw Machine

The automatic screw machine illustrated, known as Index-O and manufactured by Hahn & Kolb, Stuttgart, Germany, has been placed on the American market by Arva Stroud, New York. The machine is intended for the production of head screws, studs, headless setscrews and similar parts. The capacity is for brass and iron up to $\frac{3}{8}$ in. in diameter and mild steel rod up to $\frac{5}{16}$ in. The maximum feeding length is 1 in. Additional tool equipment, permitting of extending this range, is available.

The work spindle is located at the top of the machine at the left-hand and the screw-cutting spindle at the right-hand. The drive of the machine is from



Automatic Screw Machine of German Design. The capacity for brass and iron is up to $\frac{3}{8}$ in. and for mild steel rod up to $\frac{5}{16}$ in. The maximum feeding length is 1 in.

the line shaft, or from a motor mounted on the legs, to a tight and loose pulley on a shaft at the rear of the machine, which runs in ball bearings at constant speed. From this shaft power is transmitted by belt to a ball-bearing mounted pulley on the countershaft below. Three pairs of pulleys are provided to give six different speeds for the countershaft. The countershaft carries two pulleys, situated between the legs of the machine, and from these belts drive the work-spindle and screw-cutting spindle, respectively. The pulley driving the screw-cutting spindle has a removable rim, providing 10 and 12-in. pulleys and consequently two different speeds.

The tools comprise a round forming tool, in place of which a straight tool may be inserted; a straight cutting off tool; a die holder; a swinging grip or transfer lever which also serves as a bar stop; and a slotting arrangement with a circular saw. Both toolholder carriers are mounted on stub shafts on which they swing. The setting of turning tools is by means of adjusting screws. The forming tool carrier is provided with a stop lever and stop screw for obtaining exact bolt diameters. The swinging grip is also mounted on a stub shaft and may be set in position lengthwise on the shaft by a clamping screw.

The transfer lever is provided with a grip bushing and a stop bolt, which serves as a feed stop. The swinging grip catches the turned screw and carries it over to the slotting saw. The slotting arrangement has an adjustable ejector nose, which on the return motion of the swinging grip removes the finished screw from the bushing, causing it to fall into a receptacle.

A feature of the stock feeding mechanism is the stock inserting device provided, which is operated by a hand lever at the left end of the machine. Pulling the lever causes clamps to close and grip the stock,

further movement advancing the stock the desired distance and ejecting the tail end of the old stock.

The camshaft, which is mounted directly below the spindles, is driven from the work spindle by means of a clutch, change gears, worm and worm gear. The clutch is engaged and disengaged by the handle located next to the handwheel, the latter serving to turn the machine by hand. The change gears provide 16 different speeds to the camshaft.

The screw cutting spindle runs in ball bearings. Its speed being higher than that of the work spindle and both spindles rotating in the same direction, it overtakes the work spindle, cutting a right-hand thread. When the piece has been cut the required length, the threading spindle is caused to stop automatically. The work spindle continues its rotation, causing the die to be back of the finished piece.

The machine stops automatically if the swinging grip should collide with the tools, and it stops automatically also when the bar is used up. The floor space occupied is 26 x 55 in., and the weight 1200 lb. net. A 2-hp. motor is required to drive the machine.

Fuel Saving Conference at Pittsburgh

A fuel saving conference will be held April 2 and 3 at the William Penn Hotel, Pittsburgh, under the auspices of the combustion engineering section of the Association of Iron and Steel Electrical Engineers. The program is as follows:

Boilers, (April 2). "Prevention of Scale Formation by Boiler Water Conditioning," by Dr. R. E. Hall, physical chemist United States Bureau of Mines, Washington; Carl Fisher, superintendent of heat, power and light, Mesta Machine Co., Homestead, Pa., and George W. Smith, chemical engineer, Hagan Corporation, Pittsburgh. "Measurements of Input and Output of Boiler Rooms," by J. M. Spitzglass, engineer Republic Flow Meter Co., Chicago. "Ljungstrom Air Preheater," by B. G. Brolinson, engineer for Aktiebolaget Ljungstroms Angturbin, Wellsville, N. Y. Topical Discussion: "Coal Losses Due to Standby Steam Requirements and Demands."

Heating Furnaces, (April 3). "Heating Furnaces," by A. L. Culbertson, manager Chapman Stein Furnace Co., Mt. Vernon, Ohio. "Producers," by W. P. Chandler, fuel and experimental engineer, Carnegie Steel Co., Duquesne, Pa. "Oxygen Enrichment," by F. W. Davis, Bureau of Mines, Washington.

Inspection trips will include a visit to the Allegheny County Steam Heating Co. (largest boiler in the world, about 3000 hp.); visit to the Jones & Laughlin Steel Co. Eliza Furnaces, (blast furnace, gas fired boiler plant and modern 10,000 kw. power station.)

The general committee on arrangements is as follows: G. R. McDermott, assistant chief engineer Illinois Steel Co., South Chicago; W. P. Chandler, fuel and experimental engineer Carnegie Steel Co., Duquesne; A. G. Witting, assistant chief engineer Illinois Steel Co., Gary, Ind.; H. C. Seibert, combustion engineer Bethlehem Steel Co., South Bethlehem, Pa.; F. G. Cutler, chief, bureau of steam engineering, Tennessee Coal, Iron & Railroad Co., Birmingham; W. N. Flanagan, steam engineer Carnegie Steel Co., Youngstown, Ohio; F. E. Leahy, superintendent of power, National Tube Co., Pittsburgh; L. C. Edgar, chief engineer Carnegie Steel Co., Braddock, Pa.; Carl Fisher, superintendent of power, Mesta Machine Co., Pittsburgh; C. H. Hunt, chief engineer Weirton Steel Co., Weirton, W. Va.; J. W. Miller, steam engineer Carnegie Steel Co., Clairton, Pa.; M. J. Conway, fuel engineer Wheeling Steel Corporation, Steubenville, Ohio; James G. West, general superintendent Eliza Furnaces, Jones & Laughlin Steel Corporation, Pittsburgh; W. J. Harper, steam engineer Donner Steel Co., Buffalo, N. Y.; J. C. Allen, chief engineer Carnegie Steel Co., New Castle, Pa.

The Republic Iron & Steel Co., Youngstown, Ohio, is installing a Brassert washer at its No. 4 furnace. This will make a total of three Brassert washers installed at the Haselton plant.

BRITISH FOREIGN TRADE

Data for December and for 1923—Recovery in Exports—Imports Not Heavy

Exports of iron and steel from Great Britain last December were 361,264 gross tons, comparing with 403,261 tons in November and with the peak for the year of 435,630 tons in May. The monthly average for 1923 was 369,800 tons per month.

Imports in December were large at 158,972 tons, or the heaviest for the year. They compare with 117,628 in November and bring the monthly average for 1923 to 127,800 tons. These data include scrap iron and steel. Comparative data for both exports and imports are as follows:

British Steel Exports and Imports, Gross Tons		
	Exports	Imports
Aver. per month, first quarter, 1923...	358,208	128,032
Aver. per month, second quarter, 1923...	402,471	126,042
Aver. per month, third quarter, 1923...	329,770	126,095
October, 1923.....	401,475	117,372
November, 1923.....	403,261	117,628
December, 1923.....	361,264	158,972
Average per month, 1923.....	369,800	127,800
Average per month, 1922.....	295,980	82,215
Average per month, 1921.....	144,885	152,734
Average per month, 1920.....	274,881	128,685
Average per month, 1919.....	188,519	60,801
Average per month, 1913.....	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month		
	1913	1922
Pig iron	93,700	66,159
Ferroalloys	42,200	21,300
Steel rails	11,200	6,700
Steel plates	63,500	43,600
Galvanized sheets	20,900	19,100
Steel bars, rods, etc.	41,200	37,400
Tin plates	11,700	18,700
Black plates and sheets		

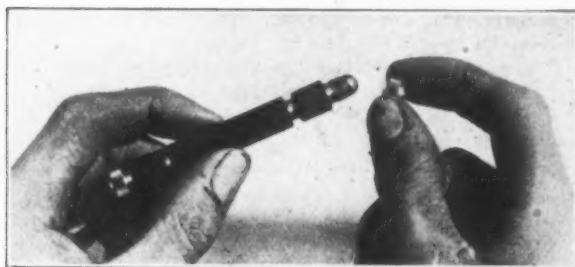
Exports of scrap iron and steel in December were 6358 tons, or 9815 tons per month for the year, as compared with 12,880 tons per month in 1922. In 1913 there were 9600 tons per month.

Data as to importations of importance are as follows in tons per month:

	1913	1923
Iron ore	620,000	487,580
Manganese ore	50,100	43,420
Pig iron and ferroalloys	18,000	9,157

Limit Gage for Inside Diameters

The limit gage illustrated, intended for the rapid checking of the inside diameter of machined parts produced in quantity, is being marketed by the Central



Tool Co., Inc., Auburn, R. I. It is available in a variety of sizes ranging from 1 in.

The gage is inserted in the opening to be tested and passed around its surface. A steel ball on each end of the gage is held in a cupped cavity by means of a sleeve, which is threaded so as to screw on the stem. The steel ball surfaces provide the measuring contacts. Wear on their surface may be compensated by loosening the sleeves and turning the balls slightly so as to expose unused portions of their surface.

American consumption of tin in 1923 was close to 75,000 tons. In the last year of the war, 1918, it was 73,700 tons, in 1920, 69,500 tons, and in 1913 it was only 45,000 tons. Imports in 1923, at 68,690 tons, topped any previous year.

Blast Furnaces and Steel Plants in the Netherlands

WASHINGTON, March 4.—While the Netherlands has a considerable foundry, rolling mill and mechanical construction industry employing some 70,000 hands, it has until the present been dependent heretofore on neighboring countries for pig iron and raw or semi-finished steel, says a report to the Department of Commerce from Acting Commercial Attaché S. H. Cross, The Hague.

The furnaces opened on Jan. 15, 1924, at Velsen, close to the mouth of the North Sea Canal and not far from Amsterdam, and are the property of the Royal Dutch Blast Furnace & Steel Works Co., founded in 1917 with a capital of 35,000,000 florins, of which the state subscribed 7,500,000. The location at Velsen was primarily due to the promise of the Amsterdam municipality to take 5,000,000 florins of the capital stock in the enterprise. Construction was first begun on the open-hearth installations and rolling mills, regarding which a community of interest was arranged with the de Muinck-Keizer Foundry (Utrecht), which constructed the plant, whose annual capacity is 30,000 tons of finished steel.

The Dutch company acquired in 1920 an interest in the German Phoenix Mining & Smelting Co. (Phonix Aktiengesellschaft fur Bergbau und Huttenbetrieb) and also bought a German coal mine, the Zeche Zollverein, beside purchasing the Belgian Carrieres de Numeche, thereby assuring itself an independent lime supply.

Owing to the high cost of raw materials, construction of the blast furnaces was not finished until 1922-1923, while the open-hearth installations were halted on account of sharp foreign competition. Electric furnaces were, however, installed. By June, 1923, the blast furnaces were already completed, and a contract was made for the sale of the electric current generated with blast furnace gas as motive power. In consequence of the Ruhr occupation, the open-hearth plant was profitably operated during most of 1923. Now that the blast furnaces are in operation, arrangements have been made with the Phoenix to convert a large proportion of the resulting pig iron. Two furnaces are at present in blast, with a production of 250 tons daily. Until better arrangements are made for canal shipments of Dutch coal, the furnaces will be largely dependent on foreign fuel, while the ore consumed will be principally French, Spanish and Swedish.

Home consumption will very likely account for not over 20 per cent of the output, the rest being exported.

Proposed Investigations in Heat Transmission

The National Research Council has been requested to undertake investigations in heat transmission, the results of which will provide the designing, operating and research engineer with more reliable information. An executive committee has been selected, consisting of:

F. Paul Anderson, director research laboratory of the American Society of Heating and Ventilating Engineers, at U. S. Bureau of Mines, Pittsburgh.

W. L. Badger, professor of chemical engineering, University of Michigan, Ann Arbor, Mich.

W. H. Carrier, president Carrier Engineering Corporation, Newark, N. J.

Harvey N. Davis, professor of mechanical engineering, Harvard University, Cambridge, Mass.

H. C. Dickinson, chief division III, Heat and Thermometry, Bureau of Standards, Washington.

H. Harrison, Brunswick-Kroeschell Co., New York.

F. E. Mathews, consulting mechanical engineer, Leonia, N. J.

George A. Orrok, consulting engineer, 124 East Fifteenth Street, New York.

T. S. Taylor, research physicist Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

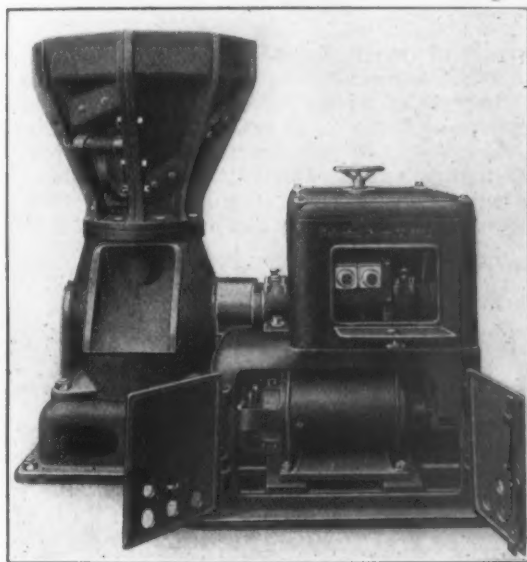
The Bay State Castings Co., Westfield, Mass., closed for several weeks, has resumed operations.

CRUSHING STRINGY TURNINGS

Machine Reduces Borings and Turnings to Short Shoveling Size—Compactness a Feature

A machine for crushing long metal borings and turnings to short shoveling size, increasing the value of this scrap, has been placed on the market by the American Crusher & Machinery Corporation, 1 Madison Avenue, New York. The easier handling of the crushed scrap, increased recovery of oil and the decreased space required for shipping or storing the shoveling size, are among the economies emphasized in connection with the use of the machine. Compactness and noiseless operation are features claimed.

Two sizes of the machine are available, the smaller of which is shown in the illustration. This is rated to crush approximately 5 tons of steel turnings per 8-hr. day, the larger machine handling about the same tonnage in an hour. The smaller unit may be equipped



for either belt or motor drive but the larger machine is available with belt drive only.

Loose turnings are thrown into the hopper, inside of which are a number of knives arranged as shown in the close-up illustration. A holder, on which knives are also mounted, rotates within the hopper. The hopper is secured to a lower or base casting at the center of which there is a vertical shaft to which the holder is attached. As the holder revolves the turnings are worked down between the lower knives and are broken up to the size desired. Crushed chips slide down the discharge chute to the floor or into a receptacle provided.

The action of the machine consists in gripping and gradually pulling in the turnings by a continuous pressing, squeezing, tearing and also cutting of the scrap. In the case of the smaller machine the best action is obtained with loose turnings rather than large matty bundles. The inside of the small machine is accessible from the top and the larger machine may be opened from below for removing foreign materials. The driving pulley also serves as a flywheel, the belt transmitting the power at loose tension, which is intended to provide an elastic medium for safety. Other safety devices are provided to prevent injury to the machine from solid pieces or other foreign matter which may be mixed with the turnings.

The larger machine may be installed with the top of the hopper extending through the ceiling to the floor above, or it may be erected with a stage around the hopper. For safety reasons and also to permit loading the machine with the maximum amount of turnings at one time, a wooden bin may be built around the hopper. Conveyors to and from the machine, carrying turnings

from the immediate vicinity of machine tools to the oil extractor and on to railroad cars or storage bins, may be effectively used. A grating may be placed in front of the hopper to permit small turnings to fall through before they get into the machine.

When the smaller machine is driven by motor, gear teeth are cut directly on the periphery of the flywheel-pulley. From the pulley shaft the drive is through bevel gears and a clutch to the vertical shaft. The drive may be arranged on either side of the discharge chute. The power required to operate the smaller and larger machines is 5 hp. and 15 hp. respectively. The weight of the smaller machine is about 1 ton and of the larger machine 4½ tons. Machines under this patent have been marketed heretofore in Europe.

British Empire Exhibition

The British Empire Exhibition, which will be held at Wembley, London, from April through October, will



Machine for Crushing Steel Turnings and Borings. The machine at the left is rated to crush 5 tons per 8-hr. day. A larger size of the machine prepares the scrap at the rate of 5 tons an hour. The components of the crushing member may be noted from view above

be confined to exhibits from Great Britain and its colonies but will be largely industrial in character and is held therefore to have a worldwide interest. Central features will be a palace of engineering and a palace of industry. The engineering section will include ship-building, marine and mechanical engineering, electrical and allied engineering, and water and land transportation, including the automotive industry. In the palace of industry there are over 20 classifications, including the chemical industries, building materials, scientific instruments, india rubber, etc.

The palace of engineering is of concrete, notable for its size, seeing that it has a floor area of over one-half million square feet. The palace of industry is nearly as large as the engineering building. Among the colonial pavilions, Canada of course will loom large. Altogether the exposition promises to have a definite international color, and its large scale is indicated by press statements that there will be "15 miles of exhibition," that "an entirely new concrete city has been erected to house it" and that "it is costing over £10,000,000 to produce." The offices of the British Empire Exhibition are at 16 Grosvenor Gardens, London, S. W. 1.

The Electric Furnace Construction Co., Philadelphia, announces that it has recently put into operation a new type of electrically heated continuous vitreous enameling furnace for the Armstrong Mfg. Co., Huntington, W. Va. It has also been awarded a contract for two large vitreous enameling furnaces for the Buckwalter Stove Co., Royersford, Pa.

Steel Exports Best in Three Years

Heavy Reconstruction Buying by Japan Puts Total Shipments Up to 247,942 Tons—Imports Lowest in 20 Months, Save November

WASHINGTON, March 4.—Aggregating 247,942 gross tons, valued at \$28,644,840, exports of iron and steel products in January were the largest for any month since February, 1921, when they totaled 393,328 tons, valued at \$101,205,061. The current tonnage is more than double that of January, 1923. The stimulated

ports of iron and steel for this period of 1,271,723 tons, valued at \$151,582,512.

Exports in January of this year exceeded by 70,098 tons those of December, when they were 177,844 tons. Exports of machinery in January of this year were valued at \$27,362,653 as compared with \$23,412,530 in December. Exports of machine tools in January were valued at \$630,733 as against \$467,565 in December.

Under a new classification, the Department of Commerce has divided sharpening and grinding machines into different classes, giving part of them by weight and not number so that the total number is not available.

Imports of iron and steel in January of this year totaled 26,675 tons, as against 27,009 tons in December, 1923. Imports of agricultural machinery in January were valued at \$835,533, as against \$892,950 in December. The imports of iron ore in January aggregated 114,599 tons as against 157,190 tons in December.

In imports the contrast with last year is striking, being produced by the heavy pig iron imports of a year

Exports, January, 1922, to December, 1923, Inclusive (Gross Tons)

	All Iron and Steel	Pig Iron	Semi-Finished Material
*Average, 1912 to 1914...	2,406,218	221,582	145,720
*Average, 1915 to 1918...	5,295,333	438,462	1,468,026
Calendar year 1919.....	4,239,837	309,682	258,907
Fiscal year 1920.....	4,212,732	248,126	288,766
Calendar year 1920.....	4,961,851	217,958	216,873
Fiscal year 1921.....	4,168,619	129,541	82,549
Calendar year 1921.....	2,218,042	28,305	10,363
Fiscal year 1922.....	1,721,418	28,330	63,127
Calendar year 1922.....	1,986,297	30,922	107,201
January, 1923.....	123,190	2,482	12,259
February.....	133,902	2,786	7,733
March.....	163,920	2,381	11,416
April.....	177,471	1,844	11,247
May.....	203,389	1,848	16,859
June.....	171,183	2,960	12,278
Fiscal year 1923.....	1,816,329	31,891	137,757
July.....	168,558	2,966	8,357
August.....	161,426	3,117	11,232
September.....	172,499	2,148	12,610
October.....	152,511	3,294	13,442
November.....	186,956	3,198	16,347
December.....	177,844	2,750	11,073
Calendar year 1923.....	1,992,595	32,318	152,748
January, 1924.....	247,942	3,812	8,594
Seven months.....	1,271,723	21,285	81,655

movement in January of this year was due entirely to heavy deliveries to Japan for use in the work of reconstruction. Shipments of plates, galvanized sheets, black sheets, tin plate, rails, galvanized wire and wire nails to Japan alone in January amounted to 94,921 tons, while for the seven months ended with January of this year, exports of these products to Japan totaled 258,449 tons, which compares with the total of all ex-

Machine Tool Exports

	January, 1924		December, 1923	
	Quantity	Value	Quantity	Value
Lathes.....	44	\$76,904	66	\$82,535
Boring and drilling machines.....	161	54,849	220	56,771
Planers, shapers and slotters.....	14	12,778	5	3,962
Bending and power presses.....	19	9,764	21	25,970
Gear cutters.....	18	24,340	47	33,336
Milling machines.....	31	32,072	28	33,897
Thread-cutting and screw machines.....	598	133,029	57	62,725
Punching and shearing machines.....	21	4,697	12	9,061
Power hammers.....	25	24,124	21	10,645
Rolling machines.....	5	8,600	1	12,000
Sharpening and grinding machines.....	440*	123,797	733	37,807
Chucks, centering lathe, drill and other metal-working tools.....	3,142	25,474	3,071	25,389
Pneumatic portable tools..	1,224	100,305	1,143	73,467
Totals.....	5,742	\$630,733	5,425	\$467,565

*Includes number of external and internal grinding machines only; "other sharpening and grinding machines" are now reported by weight instead of number.

Imports of Iron and Steel Into the United States (In Gross Tons)

	Jan., 1923	Jan., 1924	Seven Months Ended Jan., 1924	
			Jan., 1923	Jan., 1924
Pig iron.....	83,935	10,587	440,981	84,225
Ferromanganese....	4,222	1,913	71,787	43,748
Ferrosilicon.....	902	1,120	11,489	5,501
Scrap.....	21,951	5,552	135,753	50,974
Steel ingots, blooms, billets, slabs and steel bars.....	2,040	2,328	19,608	17,049
Rails and splice bars.....	1,749	669	12,020	15,853
Structural shapes....	233	1,346	6,949	8,036
Boiler and other plates.....	350	711	1,491	2,046
Sheets and saw plates.....	87	140	466	2,185
Bar iron.....	670	386	7,360	3,836
Tubular products.....	355	27	1,233	2,803
Castings and forgings.....	116	136	519	1,432
Nails and screws.....	98	6	318	362
Tinplate.....	2,128	8	2,728	661
Bolts, nuts, rivets and washers.....	14	5	64	99
Wire rods.....	746	1,302	1,742	3,263
Round iron and steel wire.....	296	323	943	1,836
Flat wire and strip steel.....	64	103	344	1,050
Wire rope and insulated wire, all kinds.....	126	13	184	558
Total.....	120,082	26,675	715,979	245,517
Manganese ore.....	10	23,081	226,232	148,741
Iron ore.....	205,532	114,599	1,132,992	1,554,538
Magnetite.....	480	584	72,115	22,360

ago, absent this year. The total inbound movement this January was only 22 per cent of that of January, 1923, while for the seven months the ratio was 34 per cent. Imports of ferroalloys have fallen off heavily since last summer, January showing less than 25 per cent of July's tonnage.

The large export movement of iron and steel products in January to Japan was easily the feature of the foreign trade during that month for the American iron and steel industry. Black sheets constituted the greatest item of export, totaling 49,946 tons and of this quantity Japan took 46,415 tons, or 93 per cent; for the seven months ended with January, Japan took 104,708 tons of black sheets, or 78 per cent of the total exports of this product of 133,114 tons.

Of steel rail exports amounting to 33,111 tons in January, Japan took 17,426 tons. Similarly, proportionately large shipments of other leading products went to Japan, as shown in an accompanying table. Indicative of the heavy buying of wire nails by Japan is the fact that out of the total exports of 9593 tons in January, Japan took 7975 tons. Of the total exports of 40,947 tons of wire nails during the seven months ended with January, Japan took 21,908 tons.

Machinery Exports from United States

	(By Value)		Seven Months Ended	
	January, 1923	January, 1924	January, 1923	January, 1924
Locomotives.....	\$415,867	\$155,076	\$3,897,167	\$2,751,237
Other Steam Engines.....	225,975	121,916	1,317,888	647,556
Boilers.....	79,689	162,987	892,609	1,105,449
Accessories and Parts.....	255,160	336,333	2,058,807	2,663,681
Automobile Engines.....		189,554	1,910,857	2,341,534
Other Internal Combustion Engines.....	122,194	169,053	2,499,281	1,305,669
Accessories and Parts for.....		208,818		1,957,092
Electric Locomotives.....	880,909	68,507	1,791,564	1,316,742
Other Electric Machinery and Apparatus.....	804,528	713,148	3,657,816	5,446,839
Excavating Machinery.....	93,706	345,459	723,748	1,052,139
Concrete Mixers.....	23,624	22,194	331,121	318,914
Road Making Machinery.....	20,434	105,160	239,597	619,774
Elevators and Elevator Machinery.....	105,900	121,111	933,555	1,069,855
Mining and Quarrying Machinery.....	632,806	974,500	3,187,539	6,665,583
Oil Well Machinery.....	569,673	522,040	1,527,539	4,261,844
Pumps.....	617,220	738,821	3,868,869	4,900,833
Lathes.....	58,683	76,904	433,065	830,561
Boring and Drilling Machines.....	57,922	54,849	329,297	457,409
Planers, Shapers and Slotters.....	15,965	12,778	163,984	151,612
Bending and Power Presses.....	23,205	9,764	97,444	299,017
Gear Cutters.....	5,550	24,380	83,826	187,626
Milling Machines.....	65,507	32,072	285,089	265,461
Thread Cutting and Screw Machines.....	28,963	133,020	154,540	417,276
Punching and Shearing Machines.....	34,902	4,697	84,494	95,454
Power Hammers.....	7,960	24,124	82,533	116,687
Rolling Machines.....		8,600	136,851	37,086
Sharpening and Grinding Machines.....	70,233	123,797	511,435	658,936
Other Metal Working Machinery and Parts of.....	392,259	347,818	3,560,964	2,737,128
Textile Machinery.....	666,287	662,102	5,548,842	4,939,518
Sewing Machines.....	638,644	1,034,258	5,195,276	6,371,851
Shoe Machinery.....	85,456	97,474	682,282	700,808
Flour-Mill and Gristmill Machinery.....	113,013	110,422	679,981	776,285
Sugar-mill Machinery.....	244,946	497,624	2,865,347	5,450,304
Paper and Pulp Mill Machinery.....	211,564	488,394	948,250	1,240,040
Sawmill Machinery.....	36,603	42,445	321,827	388,404
Other Woodworking Machinery.....	83,206	144,255	951,973	428,195
Refrigerating and Ice Making Machinery.....	234,417	226,920	1,027,471	1,237,671
Air Compressors.....	155,487	295,785	1,358,668	1,670,188
Typewriters.....	1,220,106	1,355,842	6,865,902	7,949,606
Power Laundry Machinery.....	12,722	68,218	109,936	580,817
Typesetting Machines.....	219,751	350,020	2,004,837	2,497,466
Printing Presses.....	372,945	401,346	2,492,806	2,891,733
Agricultural Machinery and Implements.....	2,840,909	4,369,386	18,030,423	32,135,462
All Other Machinery and Parts.....	8,368,765	11,410,673	59,102,686	67,453,109
Total.....	\$21,113,697	\$27,362,653	\$142,947,990	\$181,074,421

Exports of Iron and Steel

	(In Gross Tons)		Seven Months Ended January	
	January, 1923	January, 1924	January, 1923	January, 1924
Pig iron.....	2,526	3,812	19,616	21,285
Ferromanganese.....	2	1,005	380	2,085
Ferrosilicon.....	33	66	473	389
Scrap.....	1,663	8,602	20,509	53,309
Ingots, blooms, billets, sheet bar, skelp.....	10,563	4,738	60,505	53,181
Iron bars.....		598		4,059
Steel bars.....	14,691	9,266	88,390	83,729
Alloy steel bars.....	61	245	1,843	1,479
Wire rods.....	1,696	3,856	9,829	28,474
Plates, iron and steel.....	7,848	7,833	50,308	56,626
Sheets, galvanized.....	7,600	12,376	52,850	59,629
Sheets, black steel.....	6,508	49,946	51,881	133,114
Sheets, black iron.....	1,002	962	6,056	7,520
Hoops, bands, strip steel.....	2,675	2,815	20,297	20,365
Tin plate, terne plate, etc.....	5,894	25,442	37,112	97,632
Structural shapes, plain material.....	10,943	7,741	57,057	63,803
Structural material, fabricated.....	4,892	8,984	56,350	52,042
Steel rails.....	10,020	33,111	132,626	182,709
Rail fastenings, switches, frogs, etc.....	2,614	6,211	22,457	27,650
Boiler tubes, welded pipe and fittings.....	12,126	26,713	93,559	129,003
Cast iron pipe and fittings.....	3,125	2,382	33,120	17,349
Plain wire.....	5,170	9,421	49,455	51,253
Barbed wire and woven wire fencing.....	5,006	6,096	46,663	39,446
Wire cloth and screening.....	167	148	1,071	1,433
Wire rope.....	344	292	2,945	3,061
Wire nails.....	2,131	9,593	17,873	40,947
All other nails and tacks.....	502	564	4,223	4,589
Horseshoes.....	76	58	724	545
Bolts, nuts, rivets and washers, except track car wheels and axles.....	1,506	1,147	11,034	10,722
Iron castings.....	633	2,103	9,260	13,745
Steel castings.....	842	848	5,798	5,861
Forgings.....	73	853	1,028	3,175
	258	115	1,171	1,514
Total.....	123,190	247,942	996,463	1,271,723

*Not reported separately.

Imports of Machinery

	(By Value)		Seven Months Ended January	
	January, 1923	January, 1924	January, 1923	January, 1924
	No.	Value	No.	Value
Metal-working machine tools.....	34,187	\$35,293	169,460	\$236,434
Agricultural machinery and implements.....	198,823	163,187	1,312,633	1,402,838
Electrical machinery and apparatus.....	20,492	46,478	97,840	244,641
Other power generating machinery.....	428,887	47,451	967,743	442,443
Other machinery.....	158,288	347,251	1,432,276	1,776,231
Vehicles, except agricultural.....	93,223	197,873	922,378	1,455,474
Total.....	933,900	\$836,533	4,902,330	\$5,558,061

Exports by Countries of Destination

	(In Gross Tons)		Seven Months Ended January	
	January, 1923	January, 1924	January, 1923	January, 1924
Plates:				
Canada.....	5,861	6,270	35,857	41,245
South America.....	15	50	530	509
Japan.....	5	123	1,297	852
Cuba.....	87	15	454	447
Philippine Islands.....	6	53	582	501
Mexico.....	92	63	777	400
Galvanized Sheets:				
Canada.....	1,687	717	16,760	89,432
Cuba.....	757	267	3,104	6,037
Chile.....	413	133	1,601	1,548
Argentina.....	82	1,323	2,820	3,470
Philippine Islands.....	894	1,405	7,464	5,640
Central America.....	148	536	1,959	2,498
Japan.....	418	6,330	2,070	12,907
Mexico.....	455	274	3,057	3,431
Colombia.....	470	85	2,188	1,608
Black Steel Sheets:				
Japan.....	877	46,415	17,564	104,708
Canada.....	4,647	2,764	28,175	19,837
Argentina.....	50	104	1,556	716
Cuba.....	250	121	436	1,087
Philippine Islands.....		143	77	311
Tin Plate:				
Canada.....	1,801	1,983	10,871	17,417
Japan.....	2,538	13,329	10,137	34,204
Argentina.....	131	2,568	2,211	7,711
Uruguay.....	274	99	1,020	2,123
China.....	209	3,533	577	12,490
Chile.....	48	349	302	1,811
Cuba.....	285	512	1,115	3,068
Mexico.....	207	132	1,697	1,436
Hong Kong.....		664	123	2,757
Italy.....		272	443	282
Barbed Wire:				
Cuba.....		715		5,084
Argentina.....	592	1,502	7,138	4,106
Australia.....	800	265	5,269	2,676
Mexico.....	159	87	2,437	2,610
British South Africa.....	76	481	3,026	2,874
Colombia.....	652	253	3,694	2,224
Brazil.....	640	1,287	9,161	7,698
Canada.....	274	32	2,082	1,952
Steel Rails:				
Canada.....	1,265	1,884	9,822	42,946
Japan.....	1,978	17,426	48,737	68,324
Cuba.....	1,357	1,265	25,020	27,771
Chile.....	67		3,007	2,931
Brazil.....	13	1,132	1,952	5,177
Philippine Islands.....	96	879	5,189	3,241
Chosen.....	1,208	6	10,726	1,148
Honduras.....	2,339	223	4,541	1,901
Kwang Tung.....		8,603		10,563
Argentina.....			1,179	763
Mexico.....	1,243	259	4,283	1,227
Colombia.....	1	276	7,809	2,277
Galvanized Wire:				
Japan.....	239	3,323	3,009	15,546
Argentina.....	384	1,599	11,202	5,774
Canada.....	1,165	1,631	8,135	8,692
Australia.....	834	853	7,164	3,099
Brazil.....	632	961	4,832	6,442
Mexico.....	321	128	1,996	2,282
Cuba.....	210	190	1,095	1,444
United Kingdom.....	115	304	1,550	1,634
Chile.....	208	37	3,499	1,322

Sources of American Imports of Iron Ore

	(In Gross Tons)		Seven Months Ended	
	Jan., 1923	Jan., 1924	Jan., 1923	Jan., 1924
Spain.....	19,531		50,664	87,182
Sweden.....	45,560	5,713	293,329	354,427
Canada.....	1	85	1,837	11,257
Cuba.....	88,000	15,600	392,449	374,723
French Africa.....	13,300	23,552	112,671	235,148
Other Countries.....	39,140	59,649	281,993	491,796
Total.....	205,532	114,599	1,132,992	1,554,538

An Occurrence of Grain Growth in Steel

Carbonizing Under Certain Conditions Weakens the Steel —Carbon Shell Causes Internal Pressure and Weak Ferrite Bands

BY A. A. BLUE*

TESTING deeply carbonized, low carbon, 3.50 per cent nickel steel, in the Stanton impact testing machine, Miller¹ found such specimens to give greatly superior results in samples not case hardened. It would appear that by carbonizing, and thus strengthening, the outer fibers of a section under lateral stress, a greater resistance to fatigue failure

into test bars suitable for the machine used. This bar analyzed as follows: Carbon, 0.15; manganese, 0.47; phosphorus, 0.009; sulphur, 0.027, and nickel, 3.43 per cent. It was given the following heat treatment before machining: 1600 deg. Fahr., water quench; 1450 deg. Fahr., water quench, and drawn back to 1200 deg. Fahr. Six samples were prepared, and disposed of as follows:



Fig. 1—Longitudinal Section of the Longer Fragment of the Test Bar After Fracture. It is taken at right angles to the axis of vibration

would result, inasmuch as such failure generally commences in the edge of the material. With these considerations in mind, tests were made in the laboratory of the Carnegie Technical School, using a Landgraf-Turner impact bending machine.

The history of the samples previous to testing is as follows: A bar, 4 1/2 in. in diameter, was forged out to about 2 1/4 in. square by 8 in. long, and machined up

(1) Two were tested without further treatment. They withstood 504 and 463 alternations in the testing machine, average value being 484.

(2) Two were carbonized at 1650 deg. Fahr. for two hours, resulting in a case about 0.02 in. deep. They were reheated in an electric muffle furnace to 1450 and oil quenched. These samples withstood 234 and 251 (average 243) alternations.

(3) Two samples were carbonized and quenched as in (2) and then drawn back to 1200 deg. Fahr. They registered 306 and 259 (282 average) alternations.

The fractures of the bars in (1) and (3) showed a torn, ragged surface, with a well defined line across the diameter, indicating the axis of vibration. The fracture of those in (2) showed a sharp clean surface with no line across the diameter. On samples (3) the scale, which had been formed by the heat treatment after carbonizing, was disturbed in a triangular area on each side of the bar, the apex of this area being

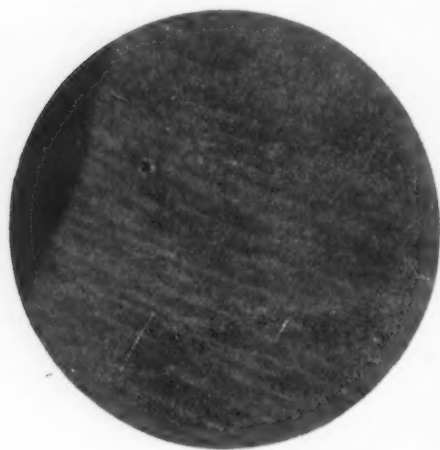


Fig. 2

Fig. 2—Structure at Location No. 1 in Fig. 1; Magnified 25 dia.

Fig. 3—Same as Fig. 2 But Magnified 100 dia.

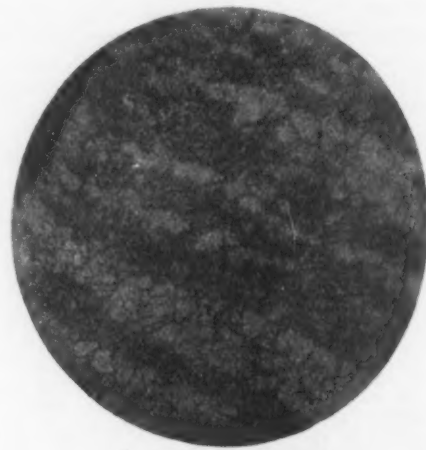


Fig. 3

Fig. 4—Same as Fig. 2 but Magnified 500 dia.



Fig. 4

Fig. 5—Structure at Location No. 2 in Fig. 1; Magnified 100 dia.



Fig. 5

*Technical director, Duff Mfg. Co., Pittsburgh.



Fig. 6

Fig. 6 — Structure at Location No. 3 in Fig. 1; Magnified 25 Dia.



Fig. 7

Fig. 7 — Structure at Location No. 1 in Bar No. 3 After Annealing at 1400 Deg. Fahr. and Cooling Slowly



Fig. 8

Fig. 8 — Structure at Location No. 1; Magnified 100 Dia. Represents cross section of the bar



Fig. 9

Fig. 9 — Structure at Location No. 4. Represents cross section of the bar

about $\frac{3}{4}$ in. from the fracture, indicating roughly the extent of the severest flexure of the bar under test.

The bars were then examined microscopically. Fig. 1 is a longitudinal section of the longer fragment of the test bar after fracture, and is taken at right angles to the axis of vibration above referred to. Location 1 is in the center of the core at the fractured surface. Location 2 is at the blending of case and core at the fractured end of the bar. Location 3 is in the center of the bar $1\frac{1}{2}$ in. from the fractured surface. Location 4 is in the center of the bar about 5 in. from the fractured end.

These photographs show longitudinal white bands of ferrite to have been formed in the carbonized test bars. These bands commence at the fractured end of the bar and extend with decreasing intensity, until at a distance of about $1\frac{1}{2}$ in. from the fracture they disappear. They do not exist in the end of the bar remote from the fracture. They do not extend into the carbonized shell of the bar. They do not exist at all in the uncarbonized test bar. Scleroscope tests did not reveal any increased hardness of any of the spots examined.

Summing up, (1) these bands are caused by the bending of the test bar; (2) their formation is also dependent upon the case surrounding the bar; (3) they indicate the cause of the early failure of these bars; (4) they show a distinct grain growth and appear to be pure ferrite.

A first glance might lead to the conclusion that these bands are of the nature of those found in cold rolled steel. This cannot be correct, however, for with the cold rolled steel, large initial grains of ferrite have simply been elongated by working, whereas in the present case there were no large initial grains, as the steel was highly refined by forging and the repeated heat treatments it received before testing.

This instance appears to be a case of grain growth under strain, as found by a number of writers.² Conditions necessary for this growth are (1) strain and

(2) reheating to some point below the critical range. Such growth is also limited to low carbon steels (i.e., relatively pure metals), Sauveur placing the high limit at 0.12 per cent carbon. In the present case, the presence of 3.50 per cent nickel no doubt has an effect also.

The only heat available in these bars to produce this grain growth was that produced by the bending of the samples, which did not exceed 350 deg. Fahr., as no coloring was effected on any of the bars. This temperature is much lower than any mentioned in the articles above referred to, about 1200 deg. being an

Fig. 10—Illustrating the Hardness of the Case Surrounding a Bar and the Resulting Difference in Flexure



average figure. On the other hand, Jeffries, in his "Laws of Grain Growth," states that the recrystallization temperature is lower (a) the greater the amount of deformation, (b) the smaller the grains prior to deformation, (c) the purer the metal, (d) the lower the temperature at which deformation is effected, and (e) the longer the time of heating. Of these, (b) is of much greater effect than any of the others, and, combined with (a), could possibly overcome the opposing tendencies (c), (d) and (e), and lower the necessary temperature to that obtained in this case. Jeffries states further: "Certain conditions of non-uniformity sometimes give rise to the formation of abnormally large grains. This is called germination."

It is thought that the presence of nickel, with its well known tendencies to segregate, may have produced an effect of this nature. The segregation of the nickel would thus explain the fact that the grain

growth in this case has occurred in bands and not throughout the metal, these bands being the elongations of the nickel segregations as originally formed in the cast metal.

Fig. 7 shows the structure of location 1, bars (3), after annealing at 1400 deg. Fahr. and cooling slowly. The effect here is that of reducing the elongated appearance of the large grains and allowing them to assume a form more nearly approaching an equilateral shape.

A curious variation of this phenomenon was found in the bars (2), i.e., case hardened, but not drawn back. Fig. 8 shows the structure found at location 1, 100 dia., and Fig. 9 shows the structure at location 4, both photographs being of the cross section of the bar at these points.

These photographs show just the reverse of the conditions found in the case hardened bars, which had been drawn back. In other words, the bands occur in the upper end of the bar and not at the lower end of the fracture. This is believed to be due to the hardness of the case surrounding the bar in this instance, and the resulting difference in flexure, as indicated in Fig. 10.

It will be readily understood how the hardened bar,

being very stiff, will extend nearly vertically from the vise during test, whereas the softer bar will get the greatest bending at the lower end. The bending and straining of the metal being responsible for the formation of these bands, their location in the bar thus locates the portions which have received the greatest strains.

The conclusions from this brief study are: (1) carbonizing under the conditions described renders the steel unfit to resist severe alternating stresses, and (2) this is due to internal pressure caused by the carbon shell, which produces marked grain growth in the form of weak ferrite bands.

Matters of further interest in this connection would be the investigation of the effects of varying the depth of case, varying the speed of vibration, varying the extent of deformation, increasing the carbon content of the steel, reheating the samples after straining to various temperatures, and the use of a hollow test bar, case hardened.

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²Sauveur, "Metallography and Heat Treatment of Iron and Steel," p. 265-271. Jeffries and Archer, *Chem. & Met. Eng.* Vol. 26, No. 8, pp. 343-346; 402-411; 449-458. Hillman, *Trans. Am. Soc. for Steel Treating*, Vol. 2, No. 5, p. 369, 574.

Metalloids in Basic Pig Iron*

Economic Significance in the Basic Open-Hearth—Eight Heats Compared—Importance of Slag and Residual Manganese

BY C. L. KINNEY, JR.

THE rapid increase in the amount of steel produced by the basic open-hearth process is an index of its ability to produce high-grade steel from raw materials of the most varied physical character and chemical analysis. This inherent adaptability of the process has resulted in a lack of care in the selection of raw materials, so that in far too many cases charges are used of a chemical and physical character not justified by local economic conditions.

A practice, or series of practices, should be used that will result in the greatest economy for the plant as a whole; therefore, the operations of blast furnace and open-hearth must be considered together. In this paper an effort has been made to show those variations in both open-hearth practice and cost that follow changes in the analysis of the pig iron and, it may be said that the theoretical costs shown are worthy of careful study and consideration.

Carbon, manganese, silicon, phosphorus and sulphur constitute the principal metalloids in basic pig iron and play the leading rôle in the production of steel by the basic open-hearth process. The percentages of each of these metalloids, with the exception of carbon, is a variable that has its genesis in the economic relation of the blast furnace plant to its ore and fuel supplies. As the amount of carbon in the iron is a saturation function of the temperature at which it is produced, the variation in the amount carried is, for any given locality and grade of iron, practically negligible and is so considered in the eight heats discussed in this paper.

The melting and refining reactions in an open-hearth furnace, either acid or basic, are essentially oxidizing and vary greatly with the type and age of the furnace, as well as the character of the fuel employed. The outstanding characteristic of the basic process, and the one that explains its predominance over the acid, is its ability to form out of the lime

charged and the phosphorus oxidized from the charge a stable calcium phosphate, which is held in solution by the basic slag.

In this paper eight representative heats have been chosen and worked out on a chemical, or material, and thermal balance and then combined on a cost basis, in an effort to determine what grouping of materials will yield the lowest cost to the mill as a unit.

To illustrate the principles involved in converting pig iron into steel, one scrap and seven ore heats have been calculated on a material and heat-balance basis. The analyses of the various pig irons and the names by which the heats are referred to follow:

PIG IRON ANALYSIS

Heat	Carbon, PerCent	Silicon, PerCent	Phos- phorus, Per Cent	Manga- nese, Per Cent	Sulphur, Per Cent
Scrap	4.30	0.75	0.20	1.00	0.04
Standard iron....	4.30	0.75	0.20	1.00	0.04
Standard iron, low-silica ore..	4.30	0.75	0.20	1.00	0.04
High - manganese iron	4.30	0.75	0.20	2.00	0.04
High - manganese iron, low-silica ore	4.30	0.75	0.20	2.00	0.04
Excess limestone	4.30	0.75	0.20	1.00	0.04
High-silicon iron	4.30	1.75	0.20	1.00	0.04
High - phosphorus iron	4.30	0.75	0.70	1.00	0.04

The scrap charge was 35,000 lb. hot metal and 65,000 lb. heavy scrap; all others were made up of 65,000 lb. hot metal, 35,000 lb. of scrap, and varying amounts of ore. "Low-silica ore" means that the ore carried 4.62 per cent silica instead of 9.29 per cent as in the other cases.

It may be properly asked what advantage may be gained or reliance placed on results of heats calculated in this manner; all were calculated using the same factors and, in the cases that correspond to operating conditions in the Chicago district, the theoretical results obtained corresponded very satisfactorily with our

*From a paper presented at the February meeting in New York of the American Institute of Mining and Metallurgical Engineers. The author is open-hearth superintendent, Illinois Steel Co., South Chicago.

(Continued on page 755)

New Line of Portable Heavy-Duty Lathes

Portable styles of the 15-in. and 17-in. heavy-duty geared-head lathes and the 11-in. heavy-duty geared-head rapid production lathe of the R. K. LeBlond Machine Tool Co., Cincinnati, have been recently placed on the market. The major units of these lathes are identical with those of the company's regular heavy-duty machines of the same size and were described in THE IRON AGE of June 29, 1922 and April 5, 1923, respectively.

The headstocks are of the selective speed type, six spindle speeds being provided on the 11-in. lathe, nine on the 15-in. and 12 on the 17-in. lathe, the speeds being controlled by two change levers. The drive is through a multiple disk clutch running in oil, and incorporating an automatic spindle brake. Spindle boxes are of bronze, babbitt lined, and are replaceable. The headstocks are of the flooded lubrication type.

The apron is of the company's one-piece box construction. Both longitudinal and transverse feeds are controlled by a single positive jaw clutch and feeds are reversed in the apron by a single lever. The 15-in. and 17-in. lathes are regularly furnished with a quick-change geared feed mechanism for screw cutting, the 11-in. lathes having a simplified geared feed mechanism, giving nine changes of feed for all classes of turning, facing and boring. The simplified geared feed is selective equipment on the two larger sizes.

The lathes, which are mounted on three wheels as shown, may be brought up to the work and cut in on any power circuit. The handle at one end of the machine is counterweighted so that when released the lathe is secured firmly to the floor and occupies practically the same space as the regular machine of the same size.

On the 15-in. and 17-in. lathes two types of motor drive are offered, either constant-speed geared or belted motor drive for a.c. or d.c. constant-speed motors. Adjustable speed d.c. motors, with geared motor drive, are also available. The arrangement illustrated is the geared motor drive construction, the drive being through a motor pinion and bakelite intermediate gear to a gear that replaces the driving pulley. The constant speed belted motor drive arrangement is the same as in the company's regular heavy duty lathes, the motor being inclosed in the base of the head-end cabinet leg. A belt tightener pulley is provided. The 11-in. lathe is provided with constant-speed belted motor drive arrangement only.

The over-the-shear capacities are 13%, 16% and 18% in. for the 11, 15 and 17-in. lathes, respectively. The shipping weights are 1560 lb., 2265 lb. and 3300 lb. respectively.

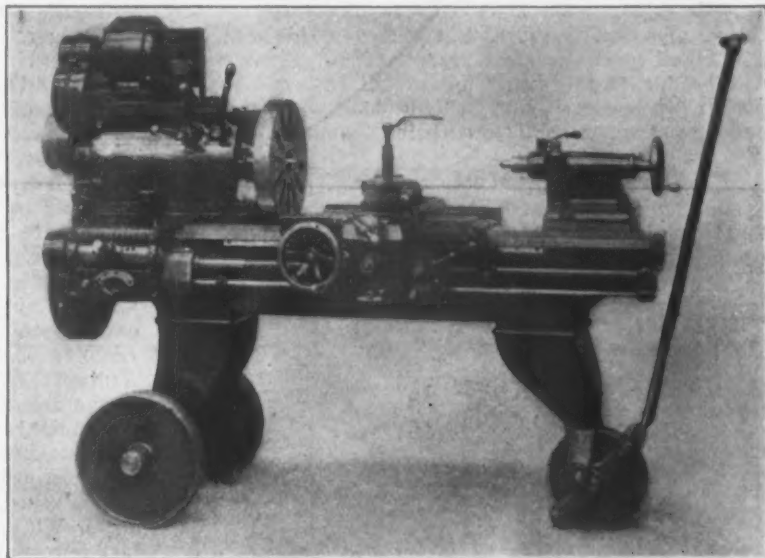
Announcement of the triennial prize conditions has been made by the Association des Ingénieurs Electriques sortis de l'Institut Electrotechnique Montefiore, 31 rue Saint Gilles, Liège, Belgium. For the best original work on the scientific advance and progress in technical electrical applications the late George Montefiore left 150,000 francs, the accumulated interest on which goes toward the prize. The amount is now 22,500 francs. Manuscript in the competition must be submitted before April 30, 1925. For detailed information application should be made to L. Calmeau, secretary-general, at the address given above.

Die castings will be discussed at a meeting on the evening of April 8 of the machine shop section of the Providence Engineering Society by Edward Casey, Franklin Die-casting Corporation, Syracuse, N. Y.

Research Narratives

In January, 1921, Engineering Foundation, 29 West Thirty-ninth Street, New York, began printing twice a month little leaflets entitled "Research Narratives." Each contained a five-minute story of research, invention or discovery. The stories, or the materials for them, were contributed by scientists and engineers of international reputation.

The purposes were to broaden general intelligence about research in science and engineering and to increase interest. Means at disposal of the foundation permitted mailing the narratives only to a limited list. The editions were soon exhausted; numerous requests for back numbers could not be satisfied. Suggestions came to the foundation that the narratives should be



The Lathe May Be Brought to the Work and Cut In On Power Circuit

collected into a book and reissued. Engineering Foundation is now having the first 50 made into a small, well bound book and offering it at 50 cents a copy.

The narratives cover a wide range of subjects. A few titles will be suggestive: The Story of Mendelism; Electric Welding; Nitrogen, Its Capture and Utilization; Whittling Iron; A Serbian Herdsman's Contribution to Telephony; The Birth of Bakelite; The Upper Critical Score. Most of the narratives are readable by students in the last years of good secondary schools as well as by their elders in business, industry, engineering, teaching and other vocations.

Plans have been completed by the Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive and refractory materials, for the construction of a new administration building, which will be situated on a plot 217 x 400 ft. Together with equipment the cost will be approximately \$300,000. It will be a three-story-and-basement structure, measuring 62 x 200 ft. Special thought has been given to make use of every available office convenience, and when the building is completed it will provide a lecture room, motion picture apparatus, cafeteria service and radio receiving equipment. Work will commence at once under the supervision of L. J. Call, engineer for the Carborundum Co., and the building is to be ready for occupancy about Nov. 10.

The industrial machinery trade of Italy was specially investigated for the bureau of foreign and domestic commerce and a pamphlet report with numerous tables based largely on the findings of A. A. Osborne, American trade commissioner at Rome, has been issued as bulletin 169, obtainable on application to the industrial machinery division of the Department of Commerce.

Trend in the Science of Metals*

Plasticity of Metals—Hull Method of Crystal Analysis—Stead's Brittleness—General Conclusions

BY DR. ZAY JEFFRIES

WITH such an example as that of tungsten and thoria before us it is not an unfair prediction that hundreds of new examples of particle growth in the solid state will be discovered in the future and that increased knowledge in this direction will be of great practical value. Part of this value will be due to the direct use of the information but perhaps a greater part will be due to the better understanding of subtle structural changes in metals.

The Plasticity of Metals

In 1899 Ewing and Rosenhain† informed the world that plastic deformation of metals takes place by slippage along definite crystallographic planes. The

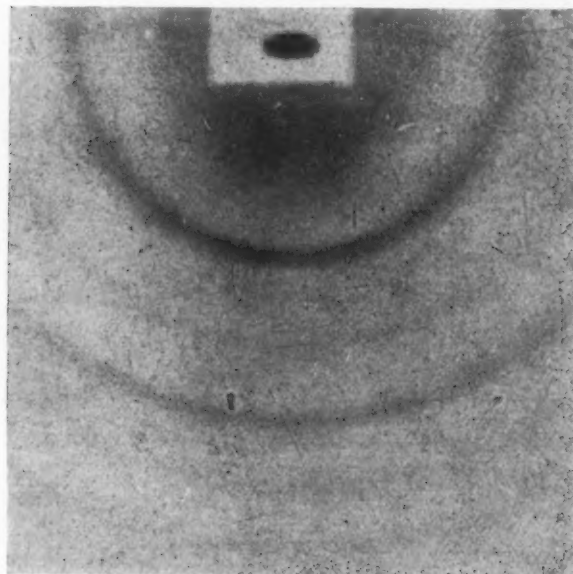


Fig. 7—Diffraction Pattern of Powdered Tungsten

mechanism of flow in a crystalline material was found to be different from that in amorphous materials like glass. The mechanism has been referred to as comparable to increasing the overall length of a deck of cards by sliding some of the cards relative to others.

For about two decades metallographists, and occasionally physicists, have experimented much and conjectured much in an endeavor to throw further light on this phenomenon. Most metallographists have arrived at the conclusion that the movement at slip planes takes place without change in orientation of the crystal fragments. It is interesting to note however that Mathewson and Phillips (*Trans. A. I. M. E.*, Vol. 54, 1916, p. 608) leaned toward the view that change of orientation occurs during plastic deformation.

During the last few years this problem has been attacked with the X-ray spectrometer and definite answers to some of the contentious questions have been provided. Bain and the speaker (*Chemical and Metallurgical Engineering*, Oct. 26, 1921, page 775) showed that a few large crystals of copper or aluminum or tungsten developed fairly well mixed orientations by a moderate amount of working at room temperature in

the cases of aluminum and copper and at about 1000 deg. C. in the case of tungsten. On reheating above the temperatures of recrystallization the orientations were still quite random but the grains were fewer in number and larger. This proved beyond any doubt that plastic deformation changes the orientation within the original grains. [The author here discusses the work of Mark, Polanyi and Schmid in Germany on zinc and bismuth wire.]

In order that conclusions too sweeping may not be drawn from these phenomenal results on single crystals it should be mentioned that all of the wires were less than about 2 mm. in diameter and comparable results might not be expected in large single crystals.

Since the discovery of the use of X-rays for crystal analysis by Laue in 1912 and particularly since the development of the so-called "powder method" by Hull (*A New Method of X-ray Crystal Analysis*, *Physical Review*, Vol. 10, No. 6, p. 661) in America, and by Debye and Scherrer in Germany, there have appeared occasional references to unusual patterns from severely cold worked metals.

Work has been done along these general lines in the Cleveland wire division laboratories of the National Lamp Works of the General Electric Co. during the last few years by E. C. Bain and A. B. Gladding and more recently also by Dr. E. Karrer, under the direction of the speaker. We have paralleled some of the work of Polanyi and Weissenberg and have obtained some results which they have not reported on. Our results agree in general with theirs as regards the structure of severely cold worked metals. We have arrived at somewhat different views, however, with respect to the structures of metals which have been severely cold worked and have then been recrystallized. Inasmuch as this method of study is, so far, the only one known which will give definite answers to questions of the orientation of submicroscopic crystal fragments some actual results will be considered.

Hull Method of Crystal Analysis

The basis of the study is the Hull method of crystal analysis. A fine grained powder or fine grained solid material with randomly oriented grains diffracts simultaneously X-rays from all possible kinds of crystallographic planes. Fig. 7 is the pattern from tungsten powder produced on a flat film, a little more than half of the diffraction pattern being shown. Tungsten has a body centered cubic space lattice. The black spot near the bottom center of the figure is produced by the primary X-ray beam. This is referred to as the origin. The farther apart the crystallographic planes are, the closer to the origin will be the diffraction line. Incidentally the farther apart the planes are, the greater is the atomic concentration on the plane and the easier is the slip due to external loading.

The planes are usually designated by their Miller indices. Fig. 8 is one of the 110 planes of a body centered cubic space lattice. The unit cube of this lattice has an atom at each corner and one in the center of the cube. The length of a side of the unit cube is the unit of measurement used in the Miller indices. The Miller indices are the ratios, expressed in whole numbers and zero, of the reciprocals of the intercepts of a plane on the major axes of the crystal system. In cubic crystals the axes are the X, Y and Z axes as used in solid geometry. The 110 planes shown in Fig. 8 for example would intersect the X and Y axes at unit distance from the origin and would

*Concluded from page 572, *THE IRON AGE*, Feb. 21. This is the last part of an abstract of the third annual Institute of Metals lecture delivered at the annual February meeting in New York of the American Institute of Mining and Metallurgical Engineers.

†Philosophical Transactions, Vol. 193, page 353.

be parallel to the Z axis. The plane is cross hatched and the encircled atoms are on the plane. The Miller indices as used here refer to a family of planes. Not only do the 110 planes include all individual parallel planes with the same atomic spacings but also five more sets of planes having the same atomic spacings making specific angles with one another. The ratios

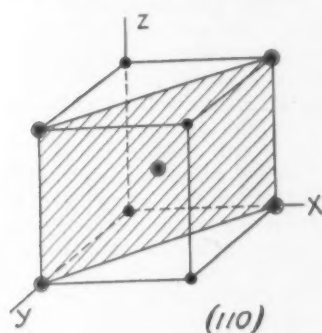
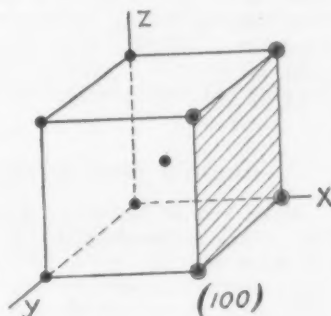


Fig. 8—One of the 110 Planes in Body-Centered Cubic Space Lattice

of the reciprocals of the intercepts are expressed in whole numbers and zero because all sets of parallel planes with significant atomic concentration can be designated in this way without resorting to the use of a large integer.

The first line in Fig. 7 is the X-ray diffraction of the 110 planes. The following table gives the Miller indices of the planes which diffract the first six lines

Fig. 9—One of the 100 Planes in Body-Centered Cubic Space Lattice



of the X-ray pattern and the number of cooperating planes of each type:

Number of Diffraction Line from Origin in X-ray Pattern for Body-Centered Cubic Lattice	Miller Index	Number of Cooperating Planes
1	110	6
2	100	3
3	112	12
4	110(2)	6
5	130	12
6	111	4

It will be noted that the 110 planes appear twice. The first line is due to the first order diffraction and the fourth line to the second order diffraction. The other planes are shown diagrammatically in Figs. 9 to 12 inclusive.

The diffraction pattern of tungsten powder is taken as a standard as regards the intensity of exposure at any part of a line. Due to the elliptical shape of the

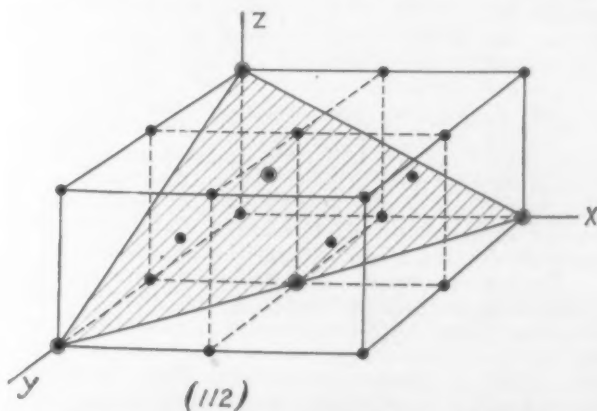


Fig. 10—One of the 112 Planes in Body-Centered Cubic Space Lattice

X-ray beam the lines are narrower and darker above the origin than in the horizontal positions.

Fig. 13 is the pattern given by a bundle of severely drawn tungsten wires, mounted parallel to one another with their axes in a horizontal position and perpendicular to the X-ray beam. The original ingot was a little less than three-eighths of an inch square and the final wire was 0.0006 in. in diameter. This corresponds to a reduction by mechanical working of 99.9997 per cent. There are only three spots in the first diffraction showing that a limited number of directions of orientations of the 110 planes is present. If certain planes are orientated in different directions, the positions of all other planes are fixed. It is therefore necessary

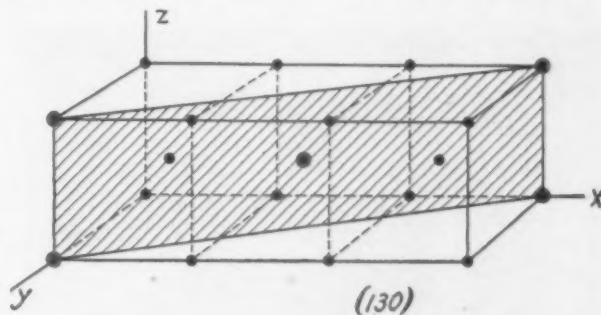


Fig. 11—One of the 130 Planes in Body-Centered Cubic Space Lattice

to study only the first two or three diffraction lines to determine the orientations. The crystal fragments of severely drawn tungsten wire are orientated in a definite manner.

Some of this wire was heated to a high temperature so as to cause recrystallization. The pattern obtained is the same as that of the as-drawn sample showing that no new orientations were developed on heating. It is not to be concluded that the properties of the as-drawn and recrystallized wires are the same or that their microstructures are similar. In the as-drawn wire no two adjacent sections around the circumference would have the same orientation. In the re-

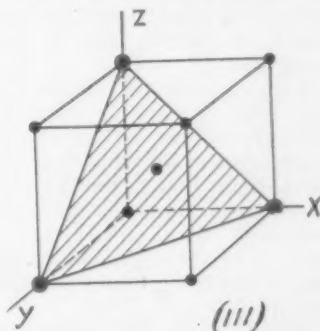


Fig. 12—One of the 111 Planes in Body-Centered Cubic Space Lattice

crystallized wire the orientation is uniform within any recrystallized grain. These grains are large enough to be seen under the microscope. In any of the recrystallized grains one of the 100 faces will be parallel with the wire axis. The 100 planes in adjacent grains must make different angles with an arbitrarily chosen wire diameter. [The author then discusses the same method applied to molybdenum and ingot iron.]

General Conclusions

From all of the results available certain conclusions can be drawn.

1. The mechanical working of an aggregate of grains with random orientation gradually changes the orientation of the grain fragments produced by slip toward certain definite positions with reference to the direction of working.

2. The definite orientations toward which the grain fragments tend are different in the various types of space lattices.

3. Only in very extreme cases of mechanical working are substantially all of the grain fragments brought into the preferred orientation. In cases of extreme rolling the structure of a foil approximates that of a single crystal. The structure of a severely drawn wire never approximates that of a single crystal.

4. Due to the tendency toward directional orientation by mechanical work and to the uneven progress of different portions of the section toward the preferred orientation, the first working of an aggregate of large grains or of a single crystal which is not initially in the preferred orientation, produces a change toward random orientations.

5. The phenomenon of recrystallization is simply the growth of the grain fragments produced by plastic deformation. Normally no new orientations are produced by heating.

6. The allotropic transformation in iron at A_2 produces new orientations.

Many other conclusions can be deduced but time does not permit of their consideration. Assuming that

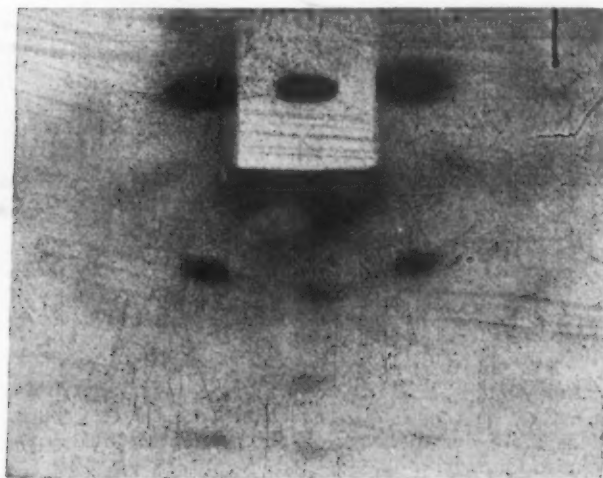


Fig. 13—Diffraction Pattern of Severely Drawn Tungsten Wire; Wire-Axis Horizontal

the conclusions mentioned above are proved or will be modified to fit more exactly future findings, then all facts relating to plastic deformation and to the properties of worked metals must be brought into line with the new conceptions. The elaborate theories which have been put forward to explain the properties of worked metals on the assumption that the grains retained their original orientation during plastic deformation must be put in the discard.

Worked iron and steel can be heated above the upper critical temperature and thoroughly random orientations of the ferrite grains can be produced. One would anticipate the formation of new and random orientations in the Alpha \leftrightarrow Beta transformation in brass. Other metals which have been worked any considerable amount and which do not have such transformations in the solid state will retain the effects of working in the crystalline structure whether in the as-worked or recrystallized condition.

We have known for several years that although wires can be drawn until they show no appreciable general elongation when broken in tension, the reduction of area at the point of fracture is very marked. In the finest tungsten wires the reduction of area is on the order of 60 per cent. This fact is easily explainable on the basis of the new information on the relation between working and crystal structure. Several of the planes of easy slip are disposed in severely drawn wire in such a manner as to make the deformation relatively easy in directions necessary for high reduction of area. This is also true of severely rolled sheet.

Stead's Brittleness

Many of you may recall the classical work of the late J. E. Stead* on "Brittleness Produced in Soft Steel by Annealing." This peculiar brittleness is sometimes referred to as Stead's brittleness. Soft steel sheets after annealing below the critical range in certain cases showed cleavage fracture on three planes perpendicular to one another. One of the planes was parallel with the sheet surface and the other two were perpendicular to the surface and made angles of 45 deg. with the direction of rolling.

*Iron and Steel Inst. 1898 II, The Metallographist, Vol. II No. 2, 1899, page 85.

These are the exact positions of the cube faces (100) in a body centered cubic space lattice after severe rolling. The X-ray results together with Stead's results demonstrate conclusively that the planes of easiest slip (110) are not the planes of easiest cleavage (100). The cleavage planes are, however, second in ease of slip.

Stead's interpretation of this phenomenon was in general correct. He states, "We are led from this to conclude that, just as light impresses a latent image on a bromide photographic plate which cannot be seen but is developed and made manifest by the action of certain chemical agencies, so the rolling appears to impress a latent disposition in the steel to crystallize in certain fixed positions, and annealing develops it afterwards." The degree of directional orientation in the as-rolled sheets is probably much greater than Stead anticipated. It is however the deviation from the preferred orientations of many of the sub-microscopic grain fragments which accounts for the absence of cleavage brittleness in the as-rolled sheets.

The metallurgical world practically ignored the lead given by Stead. This was one of the problems which could not be answered definitely with the tools available; perhaps some thought it never could be answered definitely.

Knowledge increases slowly when each fact has to be found by random hunting: it increases by leaps and bounds as our understanding of fundamentals becomes clearer. By studying grains and crystal fragments with the X-ray we have obtained a better understanding of the fundamentals of the plastic deformation of metals. The determination of the orientation of crystal fragments has been the means of changing our own minds toward proper orientation.

Tungsten Steel Bars and the Tariff

WASHINGTON, March 4.—Steel bars containing from 2 to 18 per cent tungsten, but no molybdenum, are properly subject to the additional cumulative duty of 72c. per lb. on the tungsten content in excess of 1 per cent, by virtue of the second proviso to paragraph 305 of the Fordney-McCumber tariff act. The proviso covers molybdenum and tungsten as separate and distinct dutiable entities and, if contained in excess of the prescribed percentage in material provided for in paragraph 304 (covering steel bars valued above 16c. per lb.) the separate additional cumulative duty imposed by the proviso on each alloy attaches thereto regardless of the presence or absence of the other alloy.

Decision to the foregoing effect recently was rendered by the United States general appraisers in New York. Covering duties on tool steels, it involves a question which was one of the most bitterly contested in the entire metal schedule of the present tariff act.

Protests against the duties covered steel bars valued at more than 16c. per lb. and containing from 2 to 18 per cent tungsten, but no molybdenum. Duty was levied by the collector of customs at Detroit at the primary rate of 20 per cent ad valorem and at the additional cumulative rates of 8 per cent ad valorem and 72c. on the tungsten content in excess of 1 per cent under paragraphs 304 and 305. The importers, Robert K. Greaves & Co., the decision says, conceded the correctness of the collector's classification of the merchandise as steel bars and of his assessment of the ad valorem rates of 20 and 8 per cent, but challenged the legality and validity of his assessment of the additional cumulative duty of 72c. per lb. on the tungsten content in excess of 0.60 per cent. Their claim in effect was that the last four words of the second proviso to paragraph 305 should be construed as if written: "containing both molybdenum and tungsten," and not otherwise.

The last four words of the proviso to paragraph 305, "containing molybdenum and tungsten," the board said, must be regarded, "if not as mere surplusage, then as having been added simply out of an abundance of caution, since to attempt to construe them literally as written would certainly do violence to the very purpose and intent of the whole proviso and defeat the consistently expressed will of the lawmakers."

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of
Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York
F. J. Frank, President

PRINTED IN U. S. A.

George H. Griffiths, Secretary

Owned by the United Publishers Corporation, 243 West 39th
Street, New York. H. M. Swetland, Pres. Charles G. Phillips.
Vice-Pres. A. C. Pearson, Treas. F. J. Frank, Secy.

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh:
Park Building. Boston: 425 Park Square Building. Phila-
delphia: 1420-1422 Widener Building. Cleveland: Guardian

Building. Detroit: 7338 Woodward Ave. Cincinnati: First
National Bank Bldg. Buffalo: 833 Ellicott Square. Wash-
ington: 26 Jackson Place, N. W. San Francisco: 320
Market St. London, Eng.: 11 Haymarket S.W.1.
Subscription Price: United States and Possessions, Mexico,
Cuba, \$6.00; Canada, \$8.50; Foreign, \$12.00 per year.
Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act
of March 3, 1879.

The Commercial Outlook

THE outlook for trade and industry in the United States is singularly free from menace. The point is readily seen when comparison is made between circumstances existing now and circumstances existing on previous occasions when the tide of business began to recede rapidly.

It is the general feeling in commercial circles, at the beginning of the third month of the new year, that the year does not now promise to be so good a year as was being predicted in December. The common feeling is that a change has occurred. Analysis of the talk, however, indicates that the allegations as to change refer to business sentiment rather than to the physical volume of trade. Furthermore, much of the talk refers not to developments in business but to a development—the Teapot Dome scandal—which, it is feared by some observers, may have an influence upon trade.

The current trade indices, the increased production and shipment of steel, the increasing car loadings, the high rate of labor employment, the heavy bank clearings and other measures of activity, are all either reasonably favorable or very favorable. The change ordinarily thought of is a change in tone or sentiment, which is a different thing.

When a new influence comes into sight the practical question that should at once be considered is, what good or harm will it do? For convenience of argument, let it be assumed that trade sentiment has become less favorable in the past two months and will move further in the same direction. Various comparisons show that trade as it is now being prosecuted is less exposed to injury than has usually been the case at similar junctures in the past.

One comparison may be made as to commodity prices. They have not lately advanced, but have been rather steady for more than a year and a half. They are not at a level from which large breaks could be precipitated. In 1920 the condition was vastly different.

There has been substantially full employment of labor for a long time, continuing up to date, which suggests that there is unexhausted spending power. There have been no great changes in wage or income rates which might have led to unbalancing of family budgets. With this uni-

formity in income, it is a reasonable inference that rates of spending are in closer accord with rates of income than is frequently the case, and this would mean that the spending power of the country now possesses a considerable momentum not easily arrested by sentiment.

An unfavorable turn in sentiment has often resulted in large calling of loans, producing financial stringency and failures. The record here is reassuring, there being no extension of credit such as would invite contraction leading to strain. There have been declines in the stock market, but they have not produced trouble.

When business sentiment has turned unfavorable there has usually been much canceling of orders and contracts or instructions to hold up shipments. Such canceling or postponing always greatly accentuates the unfavorable appearance of the trade situation. The danger is absent now for the reason that forward engagements are particularly light. There is nothing to cancel. The steel industry is a notable example. Business in steel is being done from week to week. It used to be doubted whether the steel industry could thrive by doing business that way, but the practical test of what occurred in the second half of last year has shown that it can.

Whether or not the tide of business will recede remains to be seen. What seems clear is that trade is free from any menace that would cause any sudden or great change.

Taxation According to Ability to Pay

THE bedevilment of Secretary Mellon's tax reduction bill has gone much further than the matter of surtaxes. In the discussions in Congress we see the three parties differing only in degree as to what is practicable. In principle they stand alike upon the theory of taxation according to ability to pay. We may consider, therefore, that the majority of the American people, as represented by Congress, indorse that principle.

Any one who desires to see whither the principle leads may usefully read "Taxation in the New State" by J. A. Hobson (1919), who is perhaps the most scholarly economist of socialistic tendency among the British "intellectuals." It means that the State shall take from each person the surplus of his income over what is needful to

maintain his efficiency as a worker. It means the abolition of thrift in all walks of life. It means the assumption by the State of the duty of making savings for future capital requirements. In short, it means nationalization of industries. It looks upon large incomes as "luck money." It does not conceive that anything more than a relatively small amount really can be earned by an individual. The recent definitions of earned income by our House of Representatives are in line with those socialistic doctrines.

It is certain, nevertheless, that the American people are not socialistic. They have been poisoned with the virus without knowing it. They have let this happen largely out of selfishness, out of the individualistic desire to escape expense and let it fall on some one else, which is but human nature.

But economists can see clearly that the mass of the people, in trying to shift the burden of carrying on the Government and in thinking that they do so, in reality achieve no such thing. While apparently escaping from taxation they increase their own cost of living, and that increase is more than what they aimed to save in taxes.

The withdrawal of the funds of rich men from industrial undertakings is crippling to production. So, too, is the withdrawal of their brains. We are witnessing indeed a semblance of strike among the industrial leaders. This easily may spread to the professional men who are able to earn more than \$20,000 per annum. Have they not already been asking themselves "Why work so hard in order to pay revenue to the Government?"

Even if we take the socialistic view of large incomes and profits being "luck money," it is but human nature once more that adventurers will not take chances if their luck be too severely penalized. Nobody will hunt for treasure-trove if the State appropriates all or most of the find. If the socialistic philosophy had obtained when we were developing our mineral resources west of the Rocky Mountains, we should have grub-staked prospectors without letting them participate in their discoveries and should not have developed so many mines.

BASIC open-hearth steel has evidently become fixed, as the predominant proportion of the output of the British steel industry. Before the war, acid open-hearth steel was the standard grade for most British users. In 1913 basic open-hearth constituted only about 29 per cent of the total steel production. Since the war there has been a decided swing to the basic process, initiated in part by the necessity during the war of using British ores and an increased proportion of scrap. In the last two years the trend has become defined until, as shown by the data published in *THE IRON AGE*, Feb. 21, basic open-hearth steel made up about 62 per cent of the 1923 total, a moderate increase over the proportion in 1922. Ten years ago a prediction that basic open-hearth steel would be largely substituted for acid would have aroused antagonism among British steel makers and users. It has been found, however, that exceedingly good steel can be made on basic

bottoms from British ores and the use of large quantities of scrap. In fact, in American practice, particularly when the principle of residual manganese is adhered to, as discussed so illuminatingly in a paper before the February convention of the mining engineers and abstracted elsewhere in this issue, steel the equal of acid open-hearth is possible. Some even go so far as to say that basic can be made superior to acid.

Oxygen and the Iron Industry

A CONVICTION that the application of oxygen or oxygenated air to metallurgical operations, under some conditions, would result in advantages was the net outcome of the symposium on this subject conducted by the recent convention of the mining engineers. The chief features were reported in *THE IRON AGE* last week. The conclusion, nevertheless, is inescapable that progress in the iron and steel industry along such lines would be not only very slow but would ultimately involve radical changes in present equipment.

The feeling is natural that "concentrated air," or the reduction of dilution due to nitrogen, might effect many interesting results, such as fuel economy, quicker chemical reactions, larger output with less labor, and so on. Air is used on a very large scale in iron and steel making, particularly in the blast furnace and the Bessemer converter. But the introduction of considerable oxygen will undoubtedly give rise to problems, some already acknowledged but others not yet recognized. There is the question of refractories, to mention one.

Another is the present relatively high cost of oxygen. The oxygen industry is but a few years old. Like all industries in their earlier days, the product is not yet producible at as low a cost as some day doubtless it will be made. And then there is "oxygen and oxygen"—the product varies in purity. Meanwhile the uses of oxygen promise to expand very largely in the next ten to twenty years, possibly revolutionizing some processes.

In the study to ascertain the best method of investigation as concerns the iron blast furnace, what appeared to be a very sensible and valuable suggestion was made on the floor of the convention to the effect that the application of oxygen should be based on experience gained in its use in the copper blast furnace. The picture that can already be drawn is a rectangular furnace for iron. Whether the Bureau of Mines, or the National Research Council or some other organization should prosecute this research—for it involves experiment and analysis of a high order—the work should be done, because it has all the marks of a worth-while task.

SWOLLEN wages are held responsible by Carl Gray, president of the Union Pacific Railroad, for the absorption of all of the increase in gross earnings of the railroads between 1917 and 1922. That increase is given as 1567 millions. To offset this, railroad employees received 918 millions of additional wages; the additional cost of coal was 135 millions, mostly due to increased miners' wages; additional taxes absorbed 122 millions;

materials and supplies took 500 millions additional, this again being due in large measure to enhanced wage schedules. The sum of the four items of cost increases was 1675 millions, or considerably greater than the increase in gross earnings. Evidently the stockholders and bondholders of the railroads did not benefit from the increased gross earnings of the roads in which their money is tied up.

The Future of Coal

THE great coal problem, so much talked about, though not so much discussed, is now to be allowed to work itself out, if possible, by competition, both in coal and in coal mining labor. The existing union bituminous scale, the Garfield scale of late 1919, has been extended for three years, to April 1, 1927. The competitive basis has much to commend it, because competition is natural. There was no better solution, really practicable, suggested.

There could have been a worse arrangement than the one made at Jacksonville by which the present union scale is continued. The complaint of the union miners has been that they did not have full employment, hence should be paid a correspondingly high rate per ton. They have had less employment in the past few months than they had last winter, and they are going to have still less employment in future. Hence, according to their theory, they could have demanded an increase in wage rates. Still lighter employment would have justified another increase, and so on until something broke.

It was said that there were too many mines. Now some mines are going to be eliminated. It will be union mines chiefly that will suffer. This may seem unfair, but any industrial enterprise has to take its chances.

The undue expansion of the coal mining industry was inseparably associated with the rise in coal acreage values. It would be difficult to

show which came first, the prospect of a wide margin in coal mining, whereby a ton of coal seemed able to stand a large exhaustion and interest charge, or a high value of coal in the ground, promising that a good price could be obtained for the coal as mined. The net result was that the typical coal company found itself with a large acreage of coal, with a large interest charge, and the sooner the coal could be mined and terminate the interest charge, the better.

If there are going to be losses in coal mining now, they will be very largely losses of interest on coal land investments or speculations. The capital put into mine development can hardly be subject to great losses, as the development can usually be preserved, and some time the capacity will be needed by old mines being worked out or by coal demand growing.

If there was no spoken or tacit arrangement at Jacksonville looking to the United Mine Workers concentrating their efforts upon the non-union fields that are particularly competitive with the union fields now tied up for three years, it may, nevertheless, be assumed that the miners' organization will do all it can in that direction. Its prospects of success are very doubtful. On the other hand, it is commonly believed in the coal industry that there will be some drift of union mines into the non-union class.

It used to be thought that the non-union production of coal was limited closely by railroad capacity, but the railroads serving non-union fields functioned rather well during the 1922 coal strike despite the great handicap of the railroad shopmen's strike, and all railroads have functioned very well since that period. The non-union mines will in all probability have a very large output.

In a nutshell, it is not altogether fanciful to say that twenty-six years ago the union coal operators had two things on their hands, one of which they needed to get rid of, the United Mine Workers and the non-union operators, and they gave the former the checkoff so as to eliminate the latter. The experiment failed, for non-union coal mining thrived. Now there is the experiment to see if non-union coal production will eliminate the United Mine Workers.

The Iron Age and Its Readers

HIGHLY gratifying to the editors of THE IRON AGE is the receipt of letters indicating the extent to which small news items, of which about 300 are published every week, are perused. For instance, a steel company, referring to an item published in the Jan. 24 issue of THE IRON AGE, wrote under date of Feb. 4: "We were all pleased to note the very complimentary comment which you made on our book in your Jan. 24 issue and we think you may be interested in knowing that on Saturday we began to receive requests for books from readers, mentioning THE IRON AGE, and this morning we have quite a handful of such requests. The other trade papers also commented favorably on the book but the number of inquiries which refer to THE IRON AGE exceed those of all the other six or seven papers combined."

Other small items which recently have been commended by subscribers are found under the heading "Plans of New Companies," all of which are based upon investigation and often are useful in giving pointers for new business.

REORGANIZATION of a corporation does usually imply one thing—namely, that the stockholders recognize that money has been wasted and therefore can earn no dividends. If proper records have been kept it is easy enough for an ordinary accountant to go back through the books and find out whether the promoters took the lion's share, or the receipts could not be made to cover the operating expenses. But a post-mortem never gives much satisfaction except perhaps to the experts. A small expenditure for competent technical advice in the first place would budget the projected enterprise, anticipate its need of working capital and make the chances of financial returns to the original investors 9 out of 10, instead of the hazardous 1 in 4, which is held up as a bugbear to prevent the development of new industries.

EXPORT BUSINESS LIGHT

Japanese Well Stocked—Chinese Ask for Tin Plate and Cast Pipe—Foreign Pig Iron Too High

NEW YORK, March 4.—Export trade is still quiet but inquiry from Japan, although small, is beginning to assume a more normal appearance. A slight increase in Chinese inquiry is noted among exporters dealing with the Far East. Business with South America is broadening.

An export company dealing exclusively with China reports negotiations with a Canton merchant on about 800 boxes of prime tin plate and has recently booked orders for about 50 tons of hoops (seconds) and 75 tons of gas pipe, 2-in., 4-in. and 6-in. An inquiry is current from Chinese sources for about 1400 feet of cast-iron water pipe, ranging in size up to 18-in.

Present Japanese buying is largely from municipalities and the usual demands of the Government. The recent tender of the Imperial Government Railways on 170,000 ft. of gas pipe is understood to have been awarded locally, the order being filled from stocks in Japan. Kobe municipality is reported in the market for frogs and switches. Nagoya, inquiring for 130 tons of girder rails and 20 tons of splice bars, A. S. C. E. specifications, has placed the splice bars with the Mitsubishi Shoji Kaisha, New York, but has not yet awarded the rails.

The Japanese market on iron and steel, while not flooded with material, is apparently so well stocked as a result of purchases following the earthquake, now arriving or due to arrive in the next two months, as to cause a decline in local quotations in some lines. Wire nails quoted as high as \$7.50 to \$10 per picule last fall are now down to \$5 per picule. But little activity is expected before April, by which time some report of plans for permanent construction work is expected from the government. In the meantime, an election has been called for May, which may result in a change of administration.

Importers of Continental steel continue to offer structural material and bars at from 2.05c. to 2.10c. per lb. base, c.i.f. Atlantic port, but these offerings are apparently confined now to Belgian products, recent advances in French prices having temporarily reduced the interest of consumers. Continental pig-iron continues too high to compete successfully with domestic iron. Recent quotations from French furnaces on the equivalent of No. 2 plain foundry iron have been as much as 20 fr. per ton higher than formerly, bringing the price to \$22 to \$23 per ton, f.o.b. Antwerp, practically equal to the eastern Pennsylvania quotations before adding 17s. to 18s. per ton ocean freight and 75c. per ton duty. German iron is no longer being offered and importers expect but little activity by German sellers until the result is known of negotiations to renew agreements between the French and Ruhr producers, expiring March 15.

Secretary Rice Addresses Engineers' Club of Youngstown District

Calvin W. Rice of New York, secretary of the American Society of Mechanical Engineers, addressed the Engineers' Club of the Youngstown district Feb. 28 at Youngstown, Ohio, giving observations of a recent trip through South America. He declared engineers of the Americas are moving toward unity and that the engineering profession in North and South America aims to attain a common ideal in international intercourse. Mr. Rice illustrated his remarks with motion pictures and hand-colored slides, showing views in Uruguay, Argentine, Chile, Peru, Costa Rica and Cuba, as well as Brazil. He states that an active engineering society exists in Rio de Janeiro.

It has brought about greater satisfaction and happiness in our industry.

Annual reports of joint committees are given, showing results accomplished by these committees on corporation conciliation in wages, safety in accidents, sanitation, health and housing, recreation and education, and half-tones of many members of the committee are published.

Koppers Co. Contracts

The By-Product Coke Corporation has awarded the Koppers Co., Pittsburgh, a contract for 110 Becker type ovens. The Koppers Co. also has taken the contract for 19 ovens, two producers, with by-product plant, coal and coke handling equipment, a 2,000,000 ft. water gas plant and gas holder for the Northern Indiana Gas & Electric Co., Fort Wayne, Ind. In addition to this work the Koppers Co. through its subsidiary, the Chicago By-Product Coke Co., has contracted to furnish the Peoples' Gas Co. of Chicago 20,000,000 cu. ft. of additional gas per day, which will be taken care of by the installation of 10 Koppers coke-fired producers at the plant of the Chicago By-Product Coke Co. and by enlarging the present water gas plant at that point.

Progress of Joint Representation of Colorado Fuel & Iron Co.

The *Industrial Bulletin* of the Colorado Fuel & Iron Co., Pueblo, has issued a joint representation annual review number, telling in detail the progress that has been made in joint representation of employers and employees. This progress is summarized by Vice-President and General Manager F. H. Weitzel in the following statements:

Joint representation has brought together employer and employee and has given each the opportunity of understanding the other's difficulties, aims and view points. It has developed mutual confidence—confidence of the employer that the employee was willing to consider with fairness everything in which the well-being of either was concerned. It has developed confidence on the part of the employee that his employer was concerned in his welfare and was anxious to help in bettering his condition and willing to give consideration to his problems in a way he had not believed.

A better understanding has been brought about by acquainting the employees with the varying business problems as they affect employees. It has in this way dispelled the ignorance of both parties, and has enabled each to see that the other was the kind of fellow who could be trusted.

It has to a large extent destroyed suspicion on both sides.

It has, in our company, increased efficiency of both management and employee.

Differences between employee and employer which constantly arise in industry are quickly settled and small grievances are prevented from becoming large ones.

Foremen do not act as impulsively as formerly. Employees do not quit on the spur of the moment when something seems to them wrong. Labor turnover is decreased.

The Henry Ford II, the first of two ore boats that are being built for the Ford Motor Co., was launched at the Lorain, Ohio, yards of the American Shipbuilding Co., March 2. Henry Ford, who had planned to be present, was unable to attend because of the illness of his young grandson, the son of Edsel Ford, for whom the boat was named. The vessel is 611 ft. long and will have a carrying capacity of 12,500 tons. It is the first large lake freight boat that will be equipped with a Diesel engine. This will be of the Sun-Duxford two cycle type of 3500 hp. built by the Sun Shipbuilding Co., Chester, Pa. The vessel will have a capacity for 300 tons of fuel oil. All of its auxiliary machinery, such as pumps, winches, etc., will be electrically driven.

Analyses of samples of delivered coal collected from July 1, 1915, to Jan. 1, 1922, have been compiled in bulletin 230 of the Bureau of Mines. It is a pamphlet of 174 pages obtainable at 20 cents from the superintendent of documents, Government Printing Office, Washington.

Iron and Steel Markets in Europe

Continental Competition Still Hurting England—Ruhr Operating on 40 Per Cent Basis—Belgium and Luxemburg Obtain Rail Orders—Australian Bridge Contract Awarded

(By Cable)

LONDON, ENGLAND, March 4.

PIG iron is weak. Consumers are more reluctant to commit themselves, owing to uncertainties, and are looking for signs of stabilization of prices at lower levels. Cleveland prices, meanwhile, are somewhat nominal, owing to absence of demand. Three Scotch furnaces have been banked.

Hematite is dull and sales are restricted. One furnace has been blown out. Sellers ask £5 1s. (\$21.71) for mixed numbers but probably would accept less for a good parcel. Foreign ore is quiet. Sellers of Bilbao Rubio ask 24s. (\$5.16) c.i.f. Tees.

Finished iron and steel is very dull in both domestic and export markets. South Africa has bought small lots of plates, but other markets are quiet. Plate makers are busy, but anxious for new orders. Few are inclined to grant concessions.

Dorman, Long & Co., Ltd., Middlesbrough, have definitely been awarded the Sydney harbor bridge contract, at £4,217,921 (\$18,137,000).

Clyde shipbuilding output in February was 13 vessels launched, totaling 10,600 tons.

Nederlandsche Scheeps (Netherlands Shipbuilding Co.) is constructing a tank steamer for British account, for delivery in 6 months. Workman, Clark & Co., Belfast, have been awarded a contract by W. R. Smith & Sons, Cardiff, for a cargo vessel of 6000 tons. Morel & Co., Cardiff, have placed an order with the Northumberland Shipbuilding Co., Inc., for a 8400-ton vessel.

Continental position is obscure. The works generally are reported full for three months and prices show a rising tendency. Germany is well sold until the middle of April, mainly on domestic orders. Continental sheet bars are being sold at £6 12s. 6d. (\$28.48) delivered at Glasgow in April to May. Two-inch billets have been done at £6 15s. (\$29.02), delivered Midlands. Higher prices now are asked and current deliveries are restricted, owing to congestion at Welsh ports, following the dockers' strike.

Luxemburg is inviting tenders for the electrification of the whole grand duchy.

In the Ruhr, the Phoenix Aktien Gesellschaft now has 3 furnaces blowing out of 6 at Hoerde and 3 out of 6 at Ruhrort.

In Belgium, the Société Anonyme des Laminaires, Hauts-Fourneaux, Forges, Fonderies et Usines de la Providence has secured a Dutch order for 3900 tons of steel rails. The Société Anonyme d'Ougrée Marihay has obtained an order for 5000 tons of rails for South Africa. Columeta, representing the Luxemburg Works of Arbed and Terres Rouges (Acieries Reunies de Burbach-Eich-Dudelange and the Société Metallurgique des Terres Rouges) have secured the bulk of the Belgian State Railroad order for 27,000 tons of rails.

Tin plate demand is improving. The market is strong on continued advance in the price of tin. Some makers are asking up to 25s. (\$5.37) basis, IC, f.o.b. Good business is being done on a basis of 24s. (\$5.16) IC, f.o.b. The minimum price still remains at 23s. 6d. (\$5.05) basis, IC, f.o.b. Export demand is broadening, except for Japan.

Galvanized sheets are steadier, on a small improve-

ment in the demand. Some works are in want of orders.

Black sheets to Far Eastern thin specifications are stagnant; 6 x 3 ft., 13's, 107 lb. are quoted at £21 5s. (4.08c. per lb.). There have been moderate sales of other gages.

GERMAN MARKET MORE ACTIVE

Domestic and Export Demand Increasing—Prices Going Slowly Upward—No Reduction in Pig Iron

(By Radiogram)

BERLIN, GERMANY, March 3.—The market is increasingly active. There is big domestic selling and a revival of export demand. Already a shortage of certain qualities of steel is reported and some producers require 8 to 10 weeks for delivery. The chief demand is for bars, sheets, wire rods and drawn wire.

Prices are going slowly upward. The producers' price for bars has risen during the last week from 126 to 128 gold marks per metric ton (1.36 to 1.38c. per lb.). Dealers' present price for bars is 133 marks (1.44c. per lb.), and for thin sheets 185 marks (2.00c. per lb.).

The Iron Industry Union has rejected the proposal to cut pig iron prices, on the ground that these now are below production cost.

GERMAN IRON AND STEEL MARKET

Pig Iron Costs Exceed Price—Ruhr Operating at 40 Per Cent—Railroad Reforms Outlined

BERLIN, GERMANY, Feb. 16.—The general trade revival continues; unemployment decreases steadily, and general prices decline, but there are signs that the price fall, which since late November has brought down the cost of living nearly 50 per cent, has now ceased. The currency stabilization seems secure if no new unfavorable factor intervenes, and the state finances have improved so rapidly that 99.2 per cent of expenditure in January was covered out of tax revenue.

The steel, iron and machinery branches are the last to share in the revival. The pig iron market is dull. The home market absorbs very little, and foreign markets show no interest, while the decline in French franc exchange has made competition difficult. Present German production cost for pig iron is, even without the special burdens imposed by the agreements with the French mission, higher than present sale price. One cause of this is the high freight rates; another is the fact that wages have not followed general prices down.

Demand for bars and beams is small. For thick sheets there is hardly any demand; medium and thin sheets are a little better. In these branches French and Belgian works have of late sold at prices 30 per cent below German. The franc collapse has not only reduced the general gold price level of these countries, but has also heavily reduced their freight rates in gold. The demand for castings for machinery is fairly good. The machinery branch itself still suffers from lack of orders; but there has been a sharp reduction in the cost of production, and the general view is that 1924 will witness an improvement.

British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.30 per £1, as follows:

Durham coke, delivered	£1 12½s.	\$6.99
Bilbao Rubio ore	1 4	5.16
Cleveland No. 1 foundry	4 17	20.85
Cleveland No. 3 foundry	4 14½	20.32
Cleveland No. 4 foundry	4 13	20.00
Cleveland No. 4 forge	4 12½	19.89
Cleveland basic	4 15	20.42
East Coast mixed	5 1	21.71
East Coast hematite	4 19	to £5 0s. 21.28 to \$21.50
Ferromanganese	17 0	73.10
Rails, 60 lb. and up	8 15	to 9 15 37.62 to 41.92
Billets	8 0	to 8 5 34.40 to 35.47
Sheet and tin plate bars, Welsh	8 18¾	38.43
Tin plates, base box	1 4½	to 1 5 5.26 to 5.37
Ship plates	9 10	to 10 0 1.82 to 1.92
Boiler plates	13 0	to 13 10 2.50 to 2.59
Tees	9 15	to 10 5 1.87 to 1.97
Channels	9 0	to 9 10 1.73 to 1.82
Beams	8 15	to 9 5 1.68 to 1.77
Round bars, ¾ to 3 in.	10 10	to 11 0 2.01 to 2.11
Galvanized sheets, 24 g.	18 5	to 18 10 3.50 to 3.55
Black sheets, 24 gage	13 10	to 13 15 2.59 to 2.64
Black sheets, Japanese specifications	15 5	2.93
Steel hoops	12 10	& 12 15* 2.40 & 2.45*
Cold rolled steel strip, 20 gage	17 10	3.36

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)				
Foundry pig iron:				
Belgium	£4 4s.	to £4 5s.	\$18.06 to \$18.27	
France	4 4	to 4 5	18.06 to 18.27	
Luxemburg	4 4	to 4 5	18.06 to 18.27	
Billets (nominal):				
Belgium	6 0	to 6 5	25.80 to 26.87	
France	6 0	to 6 5	25.80 to 26.87	
Merchant bars:				
Belgium	6 15		C. per Lb. 1.29	
Luxemburg	6 15		1.29	
France	6 15		1.29	
Joists (beams):				
Belgium	6 10 and upward		1.25	
Luxemburg	6 10 and upward		1.25	
France	6 10 and upward		1.25	
Angles:				
Belgium	8 0	to 8 5	1.53 to 1.58	
¾-in. plates:				
Belgium	7 15		1.49	
Germany	7 15		1.49	
½-in. plates:				
Luxemburg	7 15		1.49	
Belgium	7 15		1.49	

The railroad reform of Nov. 15 injuriously affected the market for permanent way material and rolling stock. By this reform railroad finance was entirely detached from state finance, so that the Republic no longer covers railroad deficits. Being so made dependent upon bank credits, the railroads had to reduce orders.

By a later reform, Feb. 14, all the federal railroads embracing 52,200 kilometers (32,400 miles), are transformed into an independent corporation called the Deutsche Reichsbahn, which will be managed on private business lines, the profits, if any, going to the Republic, whereas losses, if suffered, will be met by borrowing on security of the corporation's properties. The railroads are debt free, the 30,000,000,000 marks debt contracted by the Republic as compensation to Prussia, Bavaria and other former state railroad owners having been obliterated by the currency depreciation. They could, therefore, raise a large loan, and spend it on renewals, repairs and expansion. Krupps have received from South Africa an order for 6000 tons of steel rails.

Situation in the Ruhr

The Ruhr smelting works and steel works are still far below their normal production. The nine biggest Ruhr concerns, including the Stinnes companies, Gutehoffnung, Phoenix, Thyssen, Rhenish Steel, and Krupps have together 33 blast furnaces at work. Immediately before the Ruhr occupation they had 55 at work out of a total of 82. Thus smelting is at much below half capacity. The steel mills are variously occupied. Railroad transport everywhere is still hopelessly inadequate, so that while those steel works with water transport are producing about 50 per cent of normal, those dependent on rail average about 25 per cent.

Ruhr concerns report increasing orders from abroad. The iron and steel concerns of Hagen, Remscheid, Völkert, Schmalkalden and Solingen have gone through severe conflicts in connection with the lengthening of the working day from 8 to 10 hr. Many strikes occurred. A 57-hr. working week is the type most adopted. As, under the new 10-hr. decree, time spent in resting or at meals does not count, gross working hours sometimes extend to 12 hr. This makes possible a return to the two shifts a day system prevailing before the war.

After a year's suspension the publication of coal production statistics has been resumed. Ruhr production in January, omitting the mines in the hands of the French, was 6,187,482 metric tons, of which 5,485,040 tons were produced within occupied territory. The average daily production was 237,980 tons, against 369,745 tons in 1914. The coal car shortage is severe; of 364,285 cars demanded in occupied territory in January only 273,466 were supplied. In this matter there is no sign of improvement.

Internal customs forms a critical question for the iron and steel branches. Originally the import duty on goods from unoccupied to occupied territory was 25 per cent of the German frontier tariff; later it was raised to 100 per cent; and now the French have agreed to reduce it to 50 per cent. The duty is very burdensome. Often the same commodity pays import duty twice; foreign oil, for instance, pays first at Hamburg and then at the Ruhr frontier.

Exports and Imports

Statistics of foreign trade values in 1923 showed almost a balance. Whereas 1922 witnessed an import surplus of over 2,000,000,000 gold marks, in 1923 exports of 6,079,154,000 gold marks almost fully paid for imports of 6,081,391,000 gold marks. If allowance is made for large foreign purchases of German stocks, real estate, etc., the payment balance must have been strongly active. This has helped the Government in its new policy of maintaining the currency stable.

Statistics of iron and steel imports and exports in the full year 1923 have not yet appeared. In January to November inclusive imports of iron and steel and wares of all sorts (machinery excluded) totaled 1,828,559 metric tons, against 2,189,865 tons in the same months of 1922; exports, 1,575,375 tons, against 2,368,743 tons. The decline in exports was very large. Pig iron imports were 288,515 tons, against 261,099 tons; exports, 76,557 tons, against 144,788 tons, the passive balance in this branch heavily increasing.

Machinery imports were 5063 tons, against 9926 tons; exports, 284,203 tons, against 415,711 tons. Here the export surplus heavily declined. The balancing of the whole foreign trade account was attained, despite the unfavorable iron and steel results, partly by a decline in imports, and partly by an increase in certain kinds of exports, such as textiles.

How the French iron and steel industry is organized, covering the place occupied by the Comité des Forges, the comptoirs, etc., is described in bulletin 186 issued by the Department of Commerce under the authorship of Chester Lloyd Jones, American commercial attaché at Paris. A copy of the bulletin can doubtless be had by applying to the iron and steel division of the bureau of foreign and domestic commerce at Washington.

Production milling machines will be discussed at a meeting on the evening of March 11 of the Providence Engineering Society by Mark Whitehead, chief draftsman Potter & Johnston Machine Co., Pawtucket, R. I.

BRITISH MARKET DEPRESSED

Labor Troubles and Continental Competition Serious Obstacles—Sydney Harbor Bridge to Be Built

LONDON, ENGLAND, Feb. 21.—The wave of depression which has been passing over the iron and steel trades since the new year has in the last few days been accentuated by the dockers' dispute. Though this latter now appears to be settled, the outlook in iron and steel is still unpromising.

Few export markets seem anxious to entertain business with makers here, and buying on such account has been exceedingly poor. Domestic demand also, apart from railroad and other constructional schemes, is of such a nature that consumers purchase only to cover their immediate requirements. Makers in consequence are looking about for orders and are beginning to wonder what will happen when their present supply of current contracts is exhausted.

Pig iron is being reduced in price by dribblets, and today at 96s. or thereabouts for Cleveland foundry iron, buying is not attracted, as Continental supplies are offered at considerably less. Producers therefore are faced with the only alternative, that is, to cut down production; already two Cleveland furnaces have been banked.

Semi-finished steel has had a weaker tendency here, again due to cheap offerings of French, German and Luxemburg material, many thousands of tons of which has been bought for consumption in this country. The domestic price of billets is about £8 delivered in the Midlands, but the Continental prices are at about £7 delivered.

Finished iron and steel competition is not so acute, mainly owing to the fact that steel works on this side are fairly well off for the time being on large reconstructional orders and on some good new shipbuilding orders and, though export buying at the moment is on a poor scale, makers are not perturbed to any great extent.

It is difficult to understand fully the Continental position and the recent rapid decline of the franc exchange should be an important factor; but Continental works generally are well placed for two or three months ahead and are therefore not pressing for business. Considerable anxiety is being displayed over the penetration of some of our old-established markets, both in South America and South Africa, by Germany, but as long as the Continent is prepared to supply what is wanted at the lowest price, they will of course get the business. Krupp's have recently secured 6000 tons of 80-lb. rails and fish plates for South Africa. An Italian firm is to make 30 locomotives for Egypt, while India also is buying locomotives from Germany.

Big Bridge to Be Built

It is understood that the Australian Government has been recommended by the state engineer to accept the tender of Dorman, Long & Co., Middlesbrough, for the Sydney harbor bridge. The estimated cost of this construction is about £6,000,000 and the work will occupy 10 years. One clause of the contract provides that all materials available, or that can be manufactured, in Australia, must be used, and about 35,000 tons of steel material will be required.

A scheme is being formulated by which Bristol and Birmingham can be linked up by canal communication, which will permit the passage of 100-ton barges. The estimated cost is said to be £2,500,000, and it has been decided to approach the Government for financial assistance.

Then there is the question of Russia. If, as present indications point, the Government decides to reopen trade relations with Russia, there will of course be a huge field for iron and steel and other trades. It is expected that producers in this country will make a bold bid to cut out the Germans, who are said also to be preparing extensively. Whatever happens, the fact remains that there will be an enormous demand from Russia for iron and steel, seeing that practically nothing

has been bought since the first Revolution and that production in that country is very meager.

Iron and Steel War Record

Speaking at the annual meeting of the Swansea Metal Exchange recently, F. W. Gilbertson of W. G. Gilbertson & Co., large makers of thin galvanized sheets and of tin plate, who was reelected president of the Exchange, stated that the war record of the iron and steel trades was not really one to be proud of, in spite of attempts of the Ministry of Munitions to make the public believe it was brilliant. 'Certainly much was achieved, but it was at an outrageous cost, and much more might have been achieved at less cost with individual instead of committee management.

So far as the trades named were concerned there was more immediate and directly serious menace in the industrial developments of France and Germany. French works damaged in the war were rebuilt on magnificent lines; German works that passed to France were intact and improved, and had to a large extent been duplicated in German territory out of compensation money paid the old owners for that purpose; and the serious thing for British trade was that sheer necessity was bringing the German and French industrialists together.

Iron and Steel in Sweden

The iron and steel situation in Sweden is presented in two interesting reports of annual meetings of the Association of Iron Works and of the Friends of Mining. Production at the Swedish Iron Works last year was virtually stopped during the first six months owing to strikes. Orders accumulated, however, and during the latter part of the year the output at most of the rolling mills was highly satisfactory. A comparison of statistics is shown in the following table:

Production of Iron and Steel in Sweden
(In thousands of tons)

	1913	1922	1923
Pig iron	730	264	277
Ingots and blooms	749	350	298
Rolled and forged iron	465	219	204

At the beginning of the new year 63 blast furnaces were in operation, as against an average of 111 in 1913; 76 Lancashire hearths, as against an average of 211 in 1913; 10 Bessemer converters, as against 18 in 1913, and 38 open-hearth furnaces as against an average of 61 in 1913.

The total export of Swedish iron last year was 232,900 tons, or about 46 per cent of the total export during 1913. Last year's export of pig iron and rolled and forged iron were somewhat larger than during the previous year. During the last months of 1923 there was a falling off of prices.

The imports of iron into Sweden last year were considerable, due to the closing of the mills during the strike, the more important items being foundry iron, rolled bars and shapes, and sheets. The total imports of iron during 1923 rose to 187,800 tons.

Increased Swedish Ore Reserves

At the annual meeting of the Friends of Mining a strong address was delivered calling upon the officers of the iron works to cooperate in the setting up of a general organization for production and sales similar to those of other countries. An interesting report delivered at this meeting dealt with deep-borings which have been going on for the last ten years in the region of Kiruna and which shows conclusively that Sweden's ore resources are far greater than had previously been estimated. According to the corrected estimates the deposits in the Kiruna district alone total about 1,500,000,000 tons. Hence, Sweden has no problem of restricting exports because of shortage of natural resources.

Answers to tax problems arising in making up income tax returns are supplied by the 1924 editions of "Questions and Answers on Federal Tax Laws" and "Questions and Answers on New York State Income Tax Laws," issued by Irving Bank-Columbia Trust Co., New York.

BRITISH EXPORTS AND IMPORTS

Iron and Steel Movement for January Detailed— Galvanized Sheets and Tin Plate Largest Items

WASHINGTON, March 3.—Revising the preliminary figures given on page 601 in THE IRON AGE of Feb. 21,

British Iron and Steel Trade During December, 1923 and January, 1924 (Gross Tons)				
Items	Imports		Exports	
	Dec., 1923	Jan., 1924	Dec., 1923	Jan., 1924
Pig iron and ferroalloys	5,641	14,364	53,762	47,720
Ingots, blooms, billets and slabs.....	51,163	73,110	988	993
Tinplate .....	.....	.....	41,786	51,704
Galvanized sheets.....	.....	.....	50,674	54,809
Plates and sheets.....	5,235	7,409	47,934	42,026
Structural steel.....	5,871	4,983	6,180	7,932
Hoops and strips.....	1,320	1,099	5,936	6,109
Iron bars, rods, angles, Steel bars, rods, angles, etc.	11,785	15,169	4,677	3,916
Rails	9,685	11,049	34,119	23,015
Other railroad material	661	1,013	20,405	22,442
Bolts and nuts, includ- ing screws for metals	536	639	21,025	21,258
Nails, tacks, rivets and washers	277	161	2,272	2,186
Wire	287	334	1,379	1,346
Wire cables and rope..	3,732	2,810	6,268	5,231
Wire nails, including staples .....	.....	.....	1,935	2,064
Wire manufactures, not elsewhere specified...	3,726	3,533	422	302
Wrought tubes, pipes and fittings	1,184	563	2,120	1,743
Cast tubes, pipes and fittings	1,713	1,466	12,583	11,699
Iron and steel castings in the rough	1,028	803	7,310	5,201
Iron and steel forgings in the rough	767	847	207	1,476
	133	98	81	105

exports of iron and steel from Great Britain in January of this year totaled 318,277 gross tons, while imports were 139,450 tons. The principal items are given above.

Spanish Iron Mine Contracts

The Spanish ore mines report several contracts for the last week in January, and the general character of the market is good, Trade Commissioner Burk reports to the Department of Commerce. Although requests for quotations have been numerous, the presence of large stocks of first quality Mediterranean ores at lower prices has prevented a great amount of orders. The rise in value of the English pound is doing much toward stimulating shipments to British ports. The high dollar rate is creating many quotation inquiries from Atlantic seaboard smelters.

The port movement of the last week in January showed a tremendous increase over the previous weeks of the month, 6700 tons having been loaded for Philadelphia, 3490 tons for Middlesbrough, 2680 tons for Rotterdam, 3890 tons for Glasgow, 2775 tons for Antwerp, 2400 tons for Cardiff, and 18,000 tons for miscellaneous ports. A total of 89,716 tons of iron ore has been exported from Bilbao since Jan. 1.

Plans of Thomas Sheet Steel Co.

The Thomas Sheet Steel Co. is the name of the company which will take over and operate the former Thomas plant of the Youngstown Sheet & Tube Co., located at Niles, Ohio. Initial operations will begin March 17, when six mills will be placed under power of the 12 comprising the group.

The purchasers are W. A. Thomas, formerly president of the Brier Hill Steel Co., and Charles S. Thomas, formerly the chief interest in the DeForest Sheet & Tin Plate Co., absorbed by the Republic Iron & Steel Co.

Incorporation and organization details may be deferred until the return from Europe of W. A. Thomas, who is expected to reach his home in Youngstown about May 1. Present plans are that Myron Summers, who was formerly with the Superior Steel Co., of Louis-

ville, Ohio, and will be connected with the Thomas Sheet Steel Co., will be the president.

Thomas Williams of Niles, who has been identified with the property for a long time as superintendent, will continue in that capacity under the new management. S. P. Ker, Jr., son of the president of the Sharon Steel Hoop Co., Sharon, Pa., will be in charge of sales. Mr. Ker was previously sales manager for the Ashtabula Steel Co., Ashtabula, Ohio.

The Thomas company's plant is being improved along the lines mapped out by the Brier Hill Steel Co., which owned the property until it was absorbed by the sheet and tube company.

History of Cast Iron Discussed at Manchester

At a meeting of the northwestern branch of the Institution of Mechanical Engineers on Thursday, Feb. 14, T. Makemson read a paper entitled "The History of the Manufacture of Iron." The meeting, which was held in the Engineers' Club, Manchester, was well attended and a discussion took place on matters relating to the education of foundrymen and modern metallurgical progress.

Mr. Makemson, mentioning that iron was used in China 2300 years ago, and was used by the Egyptians and the Assyrians, said that the discovery of cast iron took place on the Continent probably during the latter half of the fourteenth century. In order to obtain a large output of wrought iron, the practice arose on the Continent of building deep furnaces. One of the best known furnaces was the German stuckofen, which was really the ancestor of the modern blast furnace. Cast iron was accidentally produced in these furnaces and its great value was gradually realized. Cast iron was introduced into England in the latter part of the fifteenth century.

The most notable iron researcher of medieval times was Dud Dudley, a son of the then Earl of Dudley, who substituted coal for charcoal as a fuel. An outstanding figure in the iron trade in the eighteenth century was John Wilkinson, of Stafford, who was, according to Mr. Makemson, the pioneer of iron founding as we know it today. The Carron works in Scotland were founded by Dr. Roebuck in 1759.

The lecturer pointed out that, in general, the methods of manufacturing pig iron had been evolved by 1830 and established on principles which are followed at the present day. For many centuries castings were made with metal obtained direct from the furnaces in which it was smelted from the ore. The cupola was invented by Réaumur about 1750.

Discussion

The discussion was not so much a discussion of the paper as one on modern casting practice. Centrifugal castings, according to Mr. Butterworth, have come to stay. The great effect of this method of casting iron is to break up the graphitic carbon. With regard to semi-steel his experience had been that the more silicon there is in the iron the more steel can be added. J. Glen Primrose said that direct castings were made at Carron; that it was quite possible and practicable to obtain rough castings direct from the blast furnace. While the use of steel in iron mixtures is not new—James Watt used steel scrap—the scientific control of it is new.

Ore and Coal Lands in Alabama to Be Developed

BIRMINGHAM, ALA., March 4.—Engineers are to be placed in the field at once on plans by the Deep Water Coal Co., organized with C. T. Meade, former vice-president DuPont interests, as president, and C. T. Lark, New York, as general counsel, and L. B. Musgrove, Birmingham, vice-president and chairman of the board, a half million acres of coal and ore lands in this State having been taken over together with Dauphin Island, near Mobile, for export base. The company is capitalized at \$20,000,000. English, French and other European capitalists are interested.

FEBRUARY IRON OUTPUT

Increase Over January 8642 Tons Per Day, All Steel-Making Grade

Twenty-one Furnaces Blown In and Five Shut Down—Net Gain Sixteen

The increase in the pig iron production of the country, which was the feature of the January figures, registered a marked expansion in February. The gain last month was over two and a half times that of the previous one, or 8642 tons per day, compared with 3159 tons per day in January and December. It was the largest gain since November, 1922, when the increase was 9898 tons per day over October.

Production of coke and anthracite pig iron for the 29 days of February amounted to 3,074,757 gross tons, or 106,026 tons per day, as compared with 3,018,890 tons, or 97,384 tons per day, for the 31 days in January. There were 21 furnaces blown in and 5 blown out, or a net gain of 16, compared with 17 in January. Of the 21 blown in 16 were steel-making and 5 were merchant furnaces. Only one steel-making furnace was shut down. There was a loss of 1116 tons per day in merchant iron production.

Ferromanganese and speigelleisen production was heavy at 32,275 tons, one furnace being estimated. The ferromanganese was 22,405 tons, or the largest since September.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from February, 1923, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
February, 1923	80,684	26,251	106,935
March	87,881	25,792	113,673
April	90,145	28,179	118,324
May	96,029	28,735	124,764
June	90,907	31,641	122,548
July	88,798	29,858	118,656
August	86,479	24,795	111,274
September	78,799	25,385	104,184
October	77,255	24,331	101,586
November	72,352	24,124	96,476
December	69,921	24,304	94,225
January, 1924	73,368	24,016	97,384
February	83,126	22,900	106,026

The figures for daily average production, beginning with January, 1918, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922	1923	1924
Jan.	77,799	106,525	97,264	77,945	53,063	104,181	97,384
Feb.	82,835	105,006	102,720	69,187	58,214	106,935	106,026
Mar.	103,648	99,685	108,900	51,468	65,675	113,673	.....
Apr.	109,607	82,607	91,327	39,768	69,070	118,324	.....
May	111,175	68,002	96,312	39,394	74,409	124,764	.....
June	110,793	70,495	101,451	35,494	78,701	122,280	.....
July	110,354	78,340	98,931	27,869	77,592	118,656	.....
Aug.	109,341	88,496	101,529	30,780	58,586	111,274	.....
Sept.	113,942	82,932	104,310	32,850	67,791	104,184	.....
Oct.	112,482	60,115	106,212	40,215	85,092	101,586	.....
Nov.	111,802	79,745	97,830	47,183	94,990	96,476	.....
Dec.	110,762	84,944	87,222	53,196	99,577	94,225	.....
Year	105,496	83,789	99,492	45,325	73,645	109,713	.....

Among the furnaces blown in during February were the following: C and D furnaces at the Lackawanna plant of the Bethlehem Steel Co. and the Standish furnace in New York; C furnace at the Bethlehem Steel Co. in the Lehigh Valley; one Eliza and the Soho furnace of the Jones & Laughlin Steel Corporation and one Lucy furnace and the Edgar Thomson Furnace of the Carnegie Steel Co. in the Pittsburgh district; one Newcastle furnace of the Carnegie Steel Co. and No. 3 Shenango furnace in the Shenango Valley; S furnace of the Cambria plant of the Bethlehem Steel Co. in western Pennsylvania; two furnaces at the Sparrows Point plant of the Bethlehem Steel Co. in Maryland; the Tod and No. 1 Hubbard furnace of the Youngs-

town Sheet & Tube Co. and No. 3 Haselton furnace of the Republic Iron & Steel Co. in the Mahoning Valley; the Ironton furnace of the Marting Iron & Steel Co. in southern Ohio; No. 11 Gary furnace in the Chicago district; one furnace of the Colorado Fuel & Iron Co. in Colorado and the LaFollette and No. 2 Rockwood furnace in Tennessee.

Among the furnaces blown out or banked during February were the following: No. 1 Northern furnace in New York; the Musconetcong furnace in New Jersey; No. 3 Swede furnace in the Schuylkill Valley; the B Detroit furnace of the M. A. Hanna Co. in Michigan and No. 1 Rockwood furnace in Tennessee.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for February and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	Feb. (29 days)	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)
New York	214,909	211,572	204,157	193,621
New Jersey	13,730	18,038	19,272	18,509
Lehigh Valley	87,583	91,863	83,332	82,748
Schuylkill Valley ..	59,020	67,757	71,838	73,069
Lower Susquehanna and Lebanon Val- leys	60,478	63,789	64,002	63,720
Pittsburgh district..	638,462	609,500	595,317	595,876
Shenango Valley ..	106,377	106,316	97,527	99,228
Western Pa.	145,984	124,503	109,419	116,910
Maryland, Virginia and Kentucky ...	67,733	60,235	61,470	68,787
Wheeling district ..	136,719	145,214	140,659	136,349
Mahoning Valley ..	330,420	326,629	293,043	280,667
Central and North- ern Ohio	270,207	265,471	266,128	265,198
Southern Ohio	47,824	43,902	44,708	24,619
Illinois and Indiana	541,649	525,975	522,994	635,362
Mich., Minn., Mo., Wis. and Colo....	125,227	126,879	124,993	111,291
Alabama	219,358	225,556	214,013	215,613
Tennessee	9,077	6,691	8,110	12,676
Total	3,074,757	3,018,890	2,920,982	2,894,295

Capacities in Blast March 1

The following table shows the number of furnaces in blast March 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Feb. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	March 1		Feb. 1	
		In Blast	Capacity per Day	In Blast	Capacity per Day
<i>New York:</i>					
Buffalo	22	18	6,980	16	6,390
Other New York	5	2	375	2	430
New Jersey	4	1	410	2	580
<i>Pennsylvania:</i>					
Lehigh Valley	16	8	2,865	7	2,710
Speigeleisen	2	2	240	2	255
Schuylkill Valley ...	15	6	1,850	7	2,270
Lower Susquehanna..	9	5	1,560	5	1,525
Ferromanganese ..	1	1	70	1	70
Lebanon Valley	4	2	380	2	390
Ferromanganese ..	2	1	70	1	70
Pittsburgh District..	55	49	22,700	45	20,250
Ferro and Spiegel..	4	4	485	4	330
Shenango Valley	17	10	4,200	8	3,540
Western Pa.	23	14	5,150	13	4,200
Ferro and Spiegel..	2	0	...	0	...
Maryland	5	5	2,180	3	1,480
Ferromanganese ..	1	1	85	1	100
Wheeling District... 15	11	11	4,715	11	4,840
<i>Ohio:</i>					
Mahoning Valley ...	28	25	11,650	22	10,955
Central and Northern	26	18	9,315	18	9,000
Southern	14	6	1,745	5	1,415
Illinois and Ind.	42	35	18,480	34	18,000
Mich., Wis. and Minn.	12	7	2,830	8	3,275
Colorado and Missouri	6	3	1,150	2	850
<i>The South:</i>					
Virginia	18	3	400	3	360
Kentucky	7	1	310	1	310
Alabama	39	23	7,510	24	7,650
Ferromanganese ..	1	1	50	0	...
Tenn., Ga. and Texas..	16	2	345	1	190
Total	411	264	108,100	248	101,435

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing

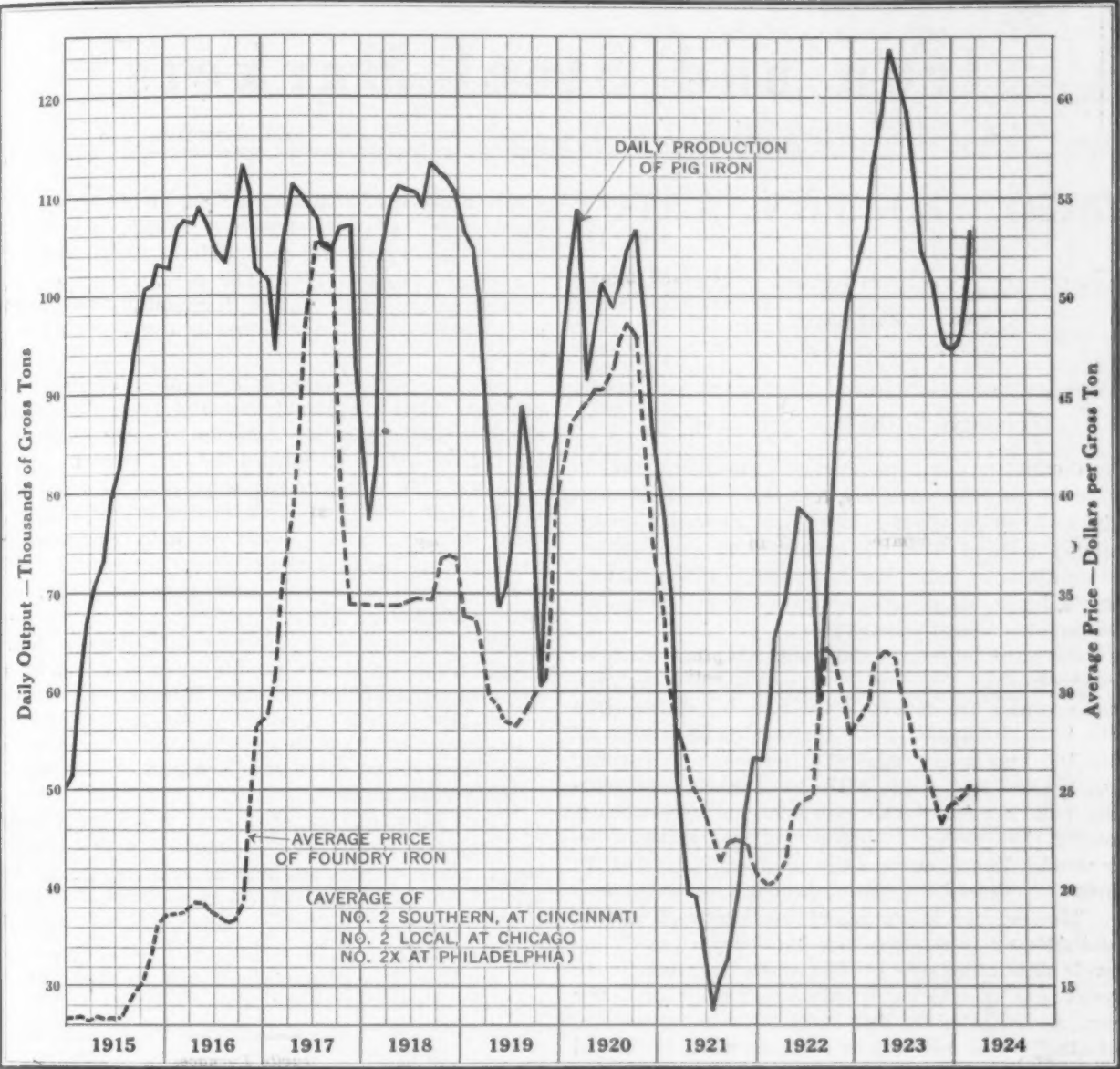


Diagram of Pig Iron Production and Price

ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons					
Total Production		Spiegeleisen and Ferromanganese			
		1923		1924	
		Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan. . . .	2,479,727	2,274,005	19,358	12,056	20,735
Feb. . . .	2,259,154	2,410,658	21,282	8,657	22,405
Mar. . . .	2,724,305		20,730	13,832	
Apr. . . .	2,704,360		20,808	7,440	
May . . .	2,976,892		19,568	9,533	
June . . .	2,727,208		19,717	18,289	
6 mos. . .	15,871,646		121,564	64,807	
July . . .	2,752,738		26,493	12,876	
Aug. . . .	2,680,851		22,045	6,586	
Sept. . . .	2,363,967		23,206	4,478	
Oct. . . .	2,394,922		20,015	15,931	
Nov. . . .	2,170,567		14,839	16,783	
Dec. . . .	2,167,563		18,069	10,124	
Year. . .	30,402,254		246,231	130,585	

Production and Price Chart

The fluctuations in pig iron production from 1915 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern

No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1920—Gross Tons					
	1920	1921	1922	1923	1924
Jan. . . .	3,015,181	2,416,292	1,644,951	3,229,604	3,018,890
Feb. . . .	2,978,379	1,937,257	1,629,991	2,994,187	3,074,757
Mar. . . .	3,375,907	1,595,523	2,035,920	3,523,868	
Apr. . . .	2,739,797	1,193,041	2,072,114	3,549,736	
May . . .	2,985,682	1,221,221	2,306,679	3,867,694	
June . . .	3,043,540	1,064,833	2,361,028	3,676,445	
½ year. .	18,138,986	9,428,166	12,050,683	20,841,534	
July . . .	3,067,043	864,555	2,405,365	3,678,334	
Aug. . . .	3,147,402	954,193	1,816,170	3,449,493	
Sept. . . .	3,129,323	985,529	2,033,720	3,125,512	
Oct. . . .	3,292,597	1,246,676	2,637,844	3,149,158	
Nov. . . .	2,934,908	1,415,481	2,849,703	2,894,295	
Dec. . . .	2,703,855	1,649,086	3,086,898	2,920,982	
Year*. .	36,414,114	16,543,686	26,880,383	40,059,308	

*These totals do not include charcoal pig iron. The 1923 production of this iron was 224,731 tons.

Tool steel parallels for tool-room and machine-shop use have been placed on the market by the L. S. Starrett Co., Athol, Mass. They are 6 in. long and are ground and finished in pairs. Two sets made up of eight pairs of parallels are available. Individual pairs or combinations of pairs may be furnished.

Iron and Steel Markets

INCREASED IRON OUTPUT

Gain in Production in Steel-Making Furnaces

Promise of Continued Activity in Steel, Though Little Forward Buying

Conditions again analyzed point to sustained steel activity for the next few months. Railroad purchases have provided a large backlog and the continued demand from the construction and automobile industries is leaving just enough of the current fairly high rate of production to satisfy the many varied channels of consumption.

Forward buying is still negligible but plans of producers call for further expansion of operation rather than the reverse. On March 1 there were 264 blast furnaces active, producing at a rate of 108,100 tons a day, against 248 on Feb. 1, turning out 101,435 tons daily, with the increase representing only a part of the expansion in steel-making, seeing that merchant production was actually decreased. The average daily shipments of steel in February exceeded those of January.

The balance being maintained between supply and demand is serving to crystallize prices at the levels maintained now for 50 consecutive weeks, with occasional exceptions, within a variation of 1 per cent, as indicated by THE IRON AGE composite price of steel. The inability to schedule mills far ahead alone makes for instability, so far as price goes. Output is apparently still fully 85 per cent of capacity for the whole industry, notwithstanding a much lower rate in some Eastern mills.

Pig iron production for the 29 days of February was 3,074,757 tons, or 106,026 a day, against 3,018,890 tons for January, or 97,384 tons a day. The daily gain of 8642 tons was made by an increased output of the steel making furnaces of 9758 tons against an actual decrease among the merchant furnaces of 1116 tons. The output of steel making furnaces shows a 14 per cent gain in two months.

The 16 additional active stacks comprise 4 for the Steel Corporation, 11 for the independent steel companies, after putting 1 on the inactive list, and 1 for the merchant iron producers after retiring 4. There are now 33 more furnaces in blast than two months ago.

Demand for steel bars is outstanding. Frequently requests are for deliveries in excess of original specifications. The Steel Corporation has transferred some bar rollings to its Duluth mill.

Disappointments over the small second quarter bookings extend to sheets. In Chicago commitments provide for good operation until summer, but even there they are in large part for specific needs. Automobile builders continue to take 35 per cent of the output and expectations from Japan are large.

The Pennsylvania Railroad's orders for 12,000

steel car bodies, requiring about 100,000 tons of light plate and blue annealed sheets, were distributed among several car builders. Other freight car orders totaled 2200. The New York Central, whose orders total 15,500, has options on 3000 additional cars. Canadian roads ordered 40 locomotives.

Second quarter semi-finished steel business is reported from Cleveland, covering from 20,000 to 25,000 tons per month. Expectations are that current prices will be reaffirmed for that period.

Structural steel awards were only 15,000 tons in the week, while inquiries totaled only 9000 tons, both low figures as compared with the weekly records since the first of the year. Structural steel orders attractive to the mills may be placed at 2.40c., Pittsburgh basis.

Pig iron sellers are having difficulty in their efforts to obtain somewhat higher prices and in a few cases, notably in malleable iron at Pittsburgh, prices have receded slightly. The market shows considerable strength in resisting pressure of buyers. There is no immediate prospect of important imports from Europe.

Some forward business in hot rolled strip steel has been booked at 2.75c., the current price of wide strip. Cold rolled strip steel is still being sold at 4.75c. base, in spite of efforts to establish 5c. The light rail market also is favorable to buyers. Quoted prices of bolts and nuts find little basis in sales. An advance will shortly be made in cold rolled steel and shafting in new cards of extras conforming to those made last summer for hot rolled bars.

Lake shipyards are figuring on four boats with expectations of one shortly being placed.

A broadening demand for steel is coming from South America, a fact taken by American steel makers to indicate that little is to be feared here from imports if Europe cannot satisfy non-steel-making countries.

A drop in steel beams has placed THE IRON AGE finished steel composite price at 2.760c. per lb., compared with 2.775c. last week.

THE IRON AGE composite price for pig iron remains at \$22.88 per gross ton.

Pittsburgh

Decrease in Sheet Buying—Concessions on Various Products

PITTSBURGH, March 4.—The tendency of steel buyers to confine purchases to their nearby requirements is beginning to tell somewhat on the market, especially as requirements in a good many lines have grown smaller in the past week or so, due to the fact that smooth mill operations resulting from ample labor supplies and unusual shipping performance for this time of the year by the railroads have permitted consumers and distributors to build up their stocks with exceptional promptitude.

There is still an excellent demand for pipe and

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Mar. 4, 1924	Feb. 26, 1924	Feb. 5, 1924	Mar. 6, 1923
No. 2X, Philadelphia...	\$24.26	\$24.26	\$23.63	\$31.14
No. 2, Valley furnace...	23.00	23.00	23.00	30.00
No. 2, Southern, Cin'tl...	26.55	26.55	26.55	30.05
No. 2, Birmingham, Ala.†...	22.50	22.50	22.50	26.00
No. 2 foundry, Chicago*	24.50	24.50	24.50	30.00
Basic, del'd, eastern Pa...	22.75	22.75	22.50	28.50
Basic, Valley furnace...	22.00	22.00	22.00	28.50
Valley Bessemer, del. P'gh.	25.26	25.26	25.26	30.77
Malleable, Chicago*	24.50	24.50	24.50	30.00
Malleable, Valley	22.50	23.00	23.00	30.00
Gray forge, Pittsburgh...	23.76	23.76	23.76	31.27
L. S. charcoal, Chicago...	29.15	29.15	29.15	34.65
Ferromanganese, furnace...	107.50	107.50	107.50	110.00

Rails, Billets, Etc., Per Gross Ton:

	Mar. 4, 1924	Feb. 26, 1924	Feb. 5, 1924	Mar. 6, 1923
O.-h. rails, heavy, at mill...	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh...	40.00	40.00	40.00	42.50
O.-h. billets, Pittsburgh...	40.00	40.00	40.00	42.50
O.-h. sheet bars, P'gh...	42.50	42.50	42.50	42.50
Forging billets, base, P'gh.	45.00	45.00	45.00	50.00
O.-h. billets, Phila...	45.17	45.17	45.17	47.67
Wire rods, Pittsburgh...	51.00	51.00	51.00	50.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb...	2.30	2.30	2.35	2.25
Light rails at mill...	2.00	2.00	2.00	2.15

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.57	2.57	2.57	2.575
Iron bars, Chicago...	2.40	2.40	2.40	2.50
Steel bars, Pittsburgh...	2.40	2.40	2.40	2.35
Steel bars, Chicago...	2.50	2.50	2.50	2.30
Steel bars, New York...	2.74	2.74	2.74	2.69
Tank plates, Pittsburgh...	2.40	2.40	2.50	2.35
Tank plates, Chicago...	2.60	2.60	2.60	2.50
Tank plates, New York...	2.64	2.64	2.69	2.69
Beams, Pittsburgh...	2.40	2.50	2.50	2.35
Beams, Chicago...	2.60	2.60	2.60	2.40
Beams, New York...	2.69	2.74	2.74	2.69
Steel hoops, Pittsburgh...	3.00	3.00	3.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Mar. 4, 1924	Feb. 26, 1924	Feb. 5, 1924	Mar. 6, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.85	3.85	3.85	3.50
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.60
Sheets, blue an'd, 9 & 10	3.00	3.00	3.00	2.65
Wire nails, Pittsburgh...	3.00	3.00	3.00	2.80
Plain wire, Pittsburgh...	2.75	2.75	2.75	2.65
Barbed wire, galv., P'gh...	3.80	3.80	3.80	3.45
Tin plate, 100-lb. box, P'gh.	\$5.50	\$5.50	\$5.50	\$4.95

Old Material, Per Gross Ton:

Carwheels, Chicago...	\$20.50	\$21.00	\$20.50	\$28.00
Carwheels, Philadelphia...	19.00	19.50	21.00	26.00
Heavy steel scrap, P'gh...	20.00	20.50	22.00	24.00
Heavy steel scrap, Phila...	17.00	17.50	19.00	24.00
Heavy steel scrap, Ch'go...	17.50	17.50	18.00	22.50
No. 1 cast, Pittsburgh...	20.50	21.00	21.50	25.00
No. 1 cast, Philadelphia...	19.00	19.50	21.00	27.00
No. 1 cast, Ch'go (net ton)	20.50	21.00	21.00	25.50
No. 1 RR. wrot, Phila...	19.00	21.00	22.00	26.00
No. 1 RR. wrot. Ch'go (net)	14.50	15.50	15.00	20.50

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$4.15	\$4.15	\$4.00	\$7.00
Foundry coke, prompt...	5.00	5.00	4.75	8.25

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	14.00	13.25	12.75	17.25
Electrolytic copper, refinery	13.75	12.87½	12.37½	16.75
Zinc, St. Louis...	6.75	6.85	6.65	7.90
Zinc, New York...	7.10	7.20	7.00	8.25
Lead, St. Louis...	9.50	9.25	8.40	8.45
Lead, New York...	9.50	9.25	8.65	8.62½
Tin (Straits), New York...	55.75	55.00	51.00	47.37½
Antimony (Asiatic), N. Y.	11.25	11.00	10.50	8.75

Composite Price, March 4, 1924, Finished Steel, 2.760c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Feb. 26, 1924, 2.775c. Feb. 5, 1924, 2.789c. March 6, 1923, 2.674c. 10-year pre-war average, 1.689c.
These products constitute 88 per cent of the United States output of finished steel	

Composite Price, March 4, 1924, Pig Iron, \$22.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Feb. 26, 1924, \$22.88 Feb. 5, 1924, 22.77 March 6, 1923, 28.77 10-year pre-war average, 15.72
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pressure for shipments of tin plate is very heavy. Production of standard rails between now and July 1 and probably beyond that date already is spoken for. With these exceptions, however, forward buying is largely absent and difficulty in formulating rolling schedules a reasonable distance ahead causes some eagerness for orders of a size to bring about such a condition.

Distribution of 11,000 steel box cars by the Pennsylvania Railroad, requiring about 110,000 tons of steel for the bodies, probably does not mean new business of that amount, since it is believed that successful bidders had protection against the tonnage before entering their bids.

There has been a noticeable decrease in sheet buying

lately, and much disappointment is expressed that the automobile builders who seemed so anxious a short time ago to learn what the second quarter prices were going to be still are laggard in entering orders for that period. One explanation is that the Government is investigating the used car prices, which in most cities are the same with all dealers for a car of a certain year and make. Dealers fear they will have to make individual appraisals and allowances on cars turned in and this may well result in their ordering fewer new cars.

No change is observed in quoted prices of the various finished steel products, but competition for desirable business which would provide back logs is very sharp and there are few lines in which price concessions

are entirely absent. Considerable weakness is observed in boiler tubes in which capacity is much in excess of present demand. No serious claim is made that quoted prices on bolts and nuts are obtainable and with some makers of cold-rolled strip steel still accepting business at 4.75c., base, the effort to establish the market at 5c. has not been particularly successful. The light rail market still is favorable to buyers and real strength is lacking in plates, while there is no question that structural steel orders of the right sort are taken at 2.40c., base.

Although there has been no official announcement, it is commonly expected that the second quarter price of sheet bars by the Steel Corporation will be \$42.50. There is little activity in semi-finished steel and the easier tendency in scrap and pig iron is being advanced as a possible cause of lower prices.

The pig iron market has been a disappointment in that there has not been sufficient demand to sustain the prices producers have sought. The past week has brought a further decline in scrap prices because of the continued absence of buyers from the market.

There having been considerable stocking of coal in anticipation of a possible suspension on mining, consumers now are drawing on their accumulations, and the market is weakened by the meagerness of new business. It is difficult for coke producers to obtain higher prices with coal prices trending down.

Steel plant operations in this and nearby districts are holding up to the recent average, but with most of the independent steel companies new business is smaller in volume than completed orders and unless there is a change for the better in buying, a lower rate of activities is not far off. The Steel Corporation seems to have fared much better than the independents in the distribution of railroad business.

Pig Iron.—This market still is a very narrow affair, although the past week has seen more of a total turnover than last week or the week before. Gain in sales, however, has been at the expense of prices. A local user of malleable iron has bought about 3000 tons of that grade and did not have to go above \$22.50, Valley furnace, as against the recent general asking price of \$23. The market has settled to \$23, Valley furnace, for No. 2 foundry, and while there have been sales of Valley iron at that price, there was one sale of 1000 tons of this grade from western Pennsylvania furnaces that stood the buyer less than \$24, delivered, an equivalent of only slightly more than \$22, figured on a Valley basis. The Pennsylvania Railroad has put out an inquiry for 4000 tons of car wheel and foundry iron for Altoona. American Steel Foundries was able to secure a round tonnage of basic iron at \$22, Valley furnace, for its Alliance, Ohio, plant, and there seems to be no further reason for quoting a higher price since there is more of this grade available at that price. Bessemer iron at \$23.50, Valley furnace, is sustained only on sales of small tonnages. Claire furnace of the Reliance Coke & Furnace Co., Sharpsville, Pa., will be blown in March 6 on foundry iron to go over later to basic, for which this company has a large order for shipment to northern Ohio. W. P. Snyder & Co. makes the average price of Bessemer iron from Valley furnaces in February, \$23.50, and on basic, \$22, the same prices as for January.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$22.00
Bessemer	23.50
Gray forge	22.50
No. 2 foundry.....	23.00
No. 3 foundry.....	22.50
Malleable	23.00
Low phosphorus, copper free....	\$23.00 to 30.00

Ferroalloys.—Hardly enough business is being done in this district to give occasion for a change in prices. The quoted price of \$107.50, seaboard or furnace, prevails on the small tonnages of ferromanganese that are being moved. Most users of this material are well covered against their requirements for the next few months, but it is observed that in spite of a high rate of steel works operation and the consequent heavy use of

the alloy, interest in future supplies is small. Only single carloads of 50 per cent ferrosilicon are being sought and on such transactions sellers report no difficulty in obtaining \$75 delivered. Imported ferrosilicon of 75 per cent silicon content, which has sold as low as \$130 delivered, now is priced at about \$140. One fair-sized inquiry for this material now is before the market. Very little demand is noted here for spiegel-eisen. Prices are given on page 749.

Semi-Finished Steel.—Tendency of steel buyers to confine purchases close to actual or nearby requirement finds reflection in the demand for semi-finished steel. Interest in second quarter requirements does not yet show up very strongly, nonintegrated manufacturers not yet being in a position to gage these needs. Open market activities are limited, since there are no demands of either a size or urgency that would compel purchases beyond contract shipments. On such business as is passing, \$40 Pittsburgh or Youngstown prevails on billets and slabs and \$42.50 is the commonly accepted price of sheet bars. It is probable that these prices will be continued on second quarter business, although some buyers are beginning to again draw attention to the wide spread between the prices of these forms of steel and those of scrap and pig iron. Too little demand exists for forging billets and skelp to provide a real test of prices. Some makers of rods are doing well, while others find the demand slow. All makers still are quoting rods at \$51 base, but it is not claimed that all business now on the bill books carries that price and there are reports of sales at \$3 to \$4 below that level. Prices are given on page 749.

Wire Products.—Reports about business still vary with the different companies; some tell of a decided expansion in the demand and of buyers ordering further ahead than was the case recently, but there are others who find conditions just the reverse. In a general way, the true picture is to be found about half-way between the two views. February shipments with most companies were the best of any February in recent years, with the exception of last year. Free forward buying such as was noted at this time last year is not evident, but as spring approaches, actual needs of consumers and jobbers are expanding and orders, while not individually large, are more numerous. There is some disappointment that demand from the agricultural regions is not heavier. Coated nails still are weak and readily obtainable at \$2.60 base per count keg. Other products are holding well to quoted prices. Prices are given on page 748.

Steel Rails.—Although light rails are still priced as high as 2.15c. base, sales at that price are few and small and there is so much competition for passing business that in a broad way the market hardly is quotable above 2c. base. The coal situation still is too depressed for the operators to be very much inclined to operate freely or to do development work.

We quote light rails rolled from billets at 2c. to 2.15c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, \$43 per gross ton mill, for Bessemer and open-hearth sections.

Iron and Steel Bars.—Orders and specifications for steel bars are coming along steadily, but buyers are exercising considerable caution and are not anticipating their requirements to any considerable extent. While there are no suggestions that less than 2.40c. base can be done, indications of an advance from that level also are lacking. There are some cases where bar mills are engaged at present chiefly in rolling narrow skelp. Increased orders for railroad cars find some reflection in the demand for iron bars, but here, as with steel bars, the demand does not tax capacity and prices are merely steady.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold finishing of screw stock analysis, \$3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Tubular Goods.—Demand for pipe still holds up strongly, but continues heavier in the butt welded sizes than in the product of the lap welding furnaces. Idle capacity is entirely in the latter kind of furnaces. Jobbers are taking all shipments however, and in some cases are trying to get more tonnage than they ordi-

narily are allotted on their contracts. There is no evidence yet that the mills are taxed in supplying the demand and it is no secret that distributors are in better shape to meet the demand than they were at this time last year. Pipe prices are well maintained, but boiler tubes still are irregular and weak despite the recent increase in locomotive orders. There is too much capacity in tubes for the present demand. Discounts are given on page 748.

Cold-Finished Steel Bars and Shafting.—It is still insisted by local makers that the market is 3c. base Pittsburgh, but it is not denied that in some districts, notably in the Middle West, this price has been shaded to meet Middle Western mill competition. Evidently 3c. base Chicago is not rigidly adhered to, and Pittsburgh district mills are not letting good customers slip away on the score of prices.

Hot-Rolled Flats.—Demand is rather better than it has been recently, but there is no evidence that buyers are abandoning a policy of buying fairly close to their known requirements. This makes it difficult for all mills to secure sufficient tonnage to operate economically and there is some irregularity in prices. Much of the current business is being booked at 3c. base Pittsburgh, but there is rather sharp competition for desirable strip tonnages, particularly in the wider stock, since owners of plate and jobbing mills do not find sufficient business in their regular lines to keep them fully engaged. Prices are given on page 748.

Cold-Rolled Strips.—Effort to maintain the market at 5c. base Pittsburgh is not entirely successful, since there are some makers who still are taking orders at 4.75c. base, and it is doubtful if all companies quoting 5c. would suffer the loss of a desirable order or a desirable account on the score of prices. The market still is quotable from 4.75c. to 5c. base.

Track Supplies.—Weakness in large spikes in the Chicago district is not entirely without effect upon local prices. That district provides a good deal of business and with local bookings rather moderate there is a tendency to seek orders elsewhere. The public quotations here range from \$3 to \$3.15 base, per 100 lb., but orders have been taken at \$3 base, and probably would be again. Small spikes are in very poor demand on account of the soft coal situation, which is not encouraging to either full mine operations or development work. Prices are given on page 748.

Structural Material.—Building trades in this city have made their usual annual demand for wage increases and some of the crafts already have quit work pending a settlement of their demands. The situation is regarded as likely to delay action on a number of structural projects pending in this city. No important jobs have lately come to local shops, but there are two or three which are being watched closely. These include a new machine shop and foundry for the Westinghouse Air Brake Co. at Wilmerding, Pa., for which Stone & Webster, Boston, are engineers, and a new plant for the Libby Owens Co., Toledo; Lockwood & Green, Boston, engineers. The Youngstown Sheet & Tube Co. is expected to place the steel for its new sheet mill soon. Makers of plain material have a good many protections out, but actual business is of rather moderate volume. Prices are given on page 748.

Plates.—Two local car builders share in the recent distribution of steel box cars by the Pennsylvania Railroad. Standard Steel Car Co. has been awarded 3000 of these cars and the Pressed Steel Car Co. 2000. The Pullman Co. and the American Car & Foundry Co. each will furnish 2000 cars and the Bethlehem Steel Co. and the Newport News Shipbuilding Co. 1000 each. It is estimated that the total order will involve about 110,000 tons of plates. American Bridge Co. was the successful bidder for eight steel barges placed by the U. S. Engineers, Florence, Ala. About 1000 tons of steel, mostly plates, will be required. Most of the independent makers still need plate business, but the Steel Corporation is well sold up at present. Prices are given on page 748.

Sheets.—Buyers still are conservative and while day-to-day orders reach a fair aggregate, they are mostly for early delivery, and with nothing to interfere with production or shipments the mills are having

some difficulty in accumulating enough business to insure reasonably full operations very far ahead. The bulk of current bookings is at quoted prices, but concessions have not disappeared. Mills are averaging about 80 to 85 per cent of capacity operation. Prices are given on page 748.

Tin Plate.—Container manufacturers are specifying freely against contracts and mill operations still are as full as is physically possible. Dry weather in California has caused some doubt as to the fruit crops, but the acreage planted in canning crops generally is so large that there is a common expectation that this year will see a record pack.

Bolts, Nuts and Rivets.—Demand for bolts and nuts continues rather uneven and generally is not very satisfactory. Buyers are confining purchases very close to actual requirements. Quoted prices find little or no basis in sales. The rivet market appears fairly steady at \$2.75 base per 100 lb. for large structural rivets, although buyers are not yet anticipating these needs to any considerable extent. Prices and discounts are given on page 748.

Coke and Coal.—While there is no quotable change in furnace coke prices, the market has a somewhat easier tendency due to the fact that mild weather has corrected some of the difficulties imposed upon the railroads by heavy snows. We still quote spot tonnage at \$4.15 to \$4.25, but the higher figure is less readily obtained than a week ago. Coke oven operators still are talking \$4.50 for second quarter tonnage, but find the response poor from blast furnace interests. The latter regard \$4.25 as a sufficiently high price in view of the fact that coke and coal are available at \$2 a ton or less, and figuring on a basis of one and one-half ton of coal to the ton of coke and 75c. for the coking charge, there would be a total of \$3.75 for coke, with the coal price at \$2 a ton. Spot foundry coke still is selling at \$5 to \$5.50, while for second quarter tonnage the market ranges from \$5.50 to \$6.50. Some buyers are balking at the latter price, which is \$2 a ton above the maximum asking price for furnace grade, and based on costs, this is considered to be too much of a spread. The coal market is extremely dull because so many consumers now are well supplied, and since there is to be no strike, they are drawing on their stocks. We quote mine run coking coal from \$1.50 to \$2 per net ton at mines, steam coal from \$1.40 to \$2, gas coal from \$2 to \$3.25 and slack from \$1.25 to \$1.50.

Old Material.—The market continues to sag under its own weight. Melters still are indifferent and dealers are not anxious to buy with the consuming demand so low and some consuming points still closed against shipments. It is expected that the embargo against Vandergrift, Pa., will be lifted this week, but Weirton and Monessen still are closed. Foundry demand also is light. Dealers with tonnages they must move have to meet buyers' valuations. Baltimore & Ohio Railroad, W. S. Galloway, purchasing agent, will receive bids until noon, March 10, on approximately 14,000 gross tons of scrap.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$20.00 to \$21.00
No. 1 cast, cupola size.....	20.50 to 21.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	22.50 to 23.00
Compressed sheet steel.....	18.00 to 18.50
Bundled sheets, sides and ends..	17.00 to 17.50
Railroad knuckles and couplers..	22.00 to 22.50
Railroad coil and leaf springs...	22.00 to 22.50
Low phosphorus blooms and billet ends	25.00 to 25.50
Low phosphorus plate and other material	24.00 to 24.50
Railroad malleable	19.50 to 19.00
Steel car axles	22.00 to 22.50
Cast iron wheels.....	20.00 to 20.50
Rolled steel wheels	22.00 to 22.50
Machine shop turnings.....	15.00 to 15.50
Sheet bar crops.....	22.50 to 23.00
Heavy steel axle turnings.....	18.00 to 18.50
Short shoveling turnings.....	15.50 to 16.00
Heavy breakable cast.....	19.50 to 20.00
Stove plate	16.00 to 16.50
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought.....	15.00 to 16.00
No. 2 railroad wrought.....	20.00 to 21.00

Chicago

Bookings of Finished Material Last Month Heavier Than in January

CHICAGO, March 4.—Bookings of local mills in plates, shapes and bars in February were slightly heavier than in January, although the month just closed was a short one. While consumers continue to buy ahead for short periods to cover their definite requirements, they are frequently asking for heavier deliveries than originally specified. Notwithstanding this general spirit of caution, aggregate obligations of Chicago producers are large, as reflected in their operations.

The Illinois Steel Co.'s steel output remains at 93 to 95 per cent of ingot capacity. At the same time it has blown in an additional furnace at South Works, giving it 10 active stacks at that plant, 11 at Gary and three at Joliet, or a total of 24 out of 27 steel works blast furnaces. The twelfth furnace at Gary is expected to go in next week. The Inland Steel Co. is operating full in its sheet department and averages 80 per cent for all of its works. It opened its books for second quarter on plates, shapes and bars yesterday.

Demand for soft steel bars continues exceptionally active, and business in structural shapes is in good volume, but commitments in sheared plates lag behind somewhat. Plate bookings, however, will no doubt be favorably affected by recent car orders. A considerable portion of the cars bought by the New York Central and probably also some of the Pennsylvania cars will be built in the West. One car builder which was awarded 6000 New York Central cars will build 4000 in Western shops.

Pig Iron.—The appearance of a few fair-sized inquiries in a quiet market has brought out slight concessions from the ruling prices, indicating that sellers' ideas are not so inflexible as heretofore. At the same time a number of orders of fair proportions have been placed. One local melter has closed for 700 tons of Southern foundry, part for immediate and part for second quarter shipment, and another Chicago user placed 300 tons of high silicon Southern for prompt delivery. Current inquiries from local users include 250 tons of foundry and 600 tons of foundry for second quarter. Shipments from Northern furnaces in February were the heaviest for six months, indicating sustained consumption. Forward contracting, however, is limited and strongly suggests that melters are not buying a pound beyond what is required for orders actually on their books. It is for this reason that sellers expect considerable additional tonnage to be placed for second quarter. In fact, it is definitely known that a number of large consumers are about to re-enter the market, one of them for from 3500 to 4000 tons. A Wisconsin user has closed for 300 tons of 10 to 11 per cent electrolytic silvery at a reported price of \$41 delivered. Another melter in that State has bought 150 tons of 14 to 16 per cent electrolytic Bessemer ferrosilicon. The market on this commodity appears to be \$40, f.o.b. Niagara Falls, or \$45.42, delivered, Chicago.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago..	\$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	25.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.50
Malleable, not over 2.25 sil.	24.50
Basic	24.50
High phosphorus	24.50
Southern No. 2	\$29.01 to 30.01
Low phos., sil. 1 to 2 per cent, copper free	\$3.00 to 34.00
Silvery, sil. 8 per cent.	38.29

Plates.—Local mills are not yet fully obligated in sheared plates, but they are confident that additional orders for car steel will more than take up the slack in their rolling schedules. It is interesting to note,

however, that fully three-quarters of the freight cars ordered thus far this year have been placed by so-called Eastern carriers, whose earnings have been considerably better than those of Western lines. Within the past week the New York Central and the Pennsylvania have purchased a total of 27,000 cars and, inasmuch as these roads have terminals in Chicago, it is expected that part of this equipment will be built in the West. No new oil storage tank buying is reported, but considerable work will go ahead if operations are suspended in fields leased from the Government. Prices are firm at 2.60c. Chicago mill.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Ferroalloys.—Outside of a sale of 200 tons of ferromanganese to a local consumer, the market in the ferroalloys has been quiet. Foreign offerings of spiegeleisen have largely disappeared, but domestic material is still available at \$37, Eastern furnace, for quantities and \$40 for carload lots.

We quote 80 per cent ferromanganese, \$115.06, delivered; 50 per cent ferrosilicon, \$75, delivered; spiegeleisen, 18 to 22 per cent, domestic, \$45.58 to \$48.58, delivered.

Bars.—Demand for soft steel bars is unabated and the heavily committed condition of local mills is reflected in occasional sales by mills east of here at full Pittsburgh base prices. Such transactions, however, are still exceptional. Automobile production is heavy, but in some cases manufacturers have been forced to reduce operations because they permitted their inventories to run too low. On the other hand, a leading manufacturer of low priced cars is reported to have diminished his operating schedules slightly because of a decline in orders. In general, however, bar users are increasing their specifications rather than reducing them, indicating that industrial activity as a whole is still on the ascending scale. Purchasers of bar iron show slight improvement, but mills are still operating from hand to mouth. This commodity is used largely by the railroads and at present they are not buying in quantity. Rail steel bar mills are more comfortably obligated, although their condition is by no means as favorable as that of soft steel bar producers. Prices of all types of bars are firm.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. to 3c. base; hoops, 4.45c.; bands, 3.95c.

Bolts and Nuts.—Bookings have fallen off somewhat, but not enough to cause any great concern. The ruling market on large machine bolts remains at 60 and 10 off, although 60 and 5 off is quoted in some instances. It remains to be seen whether the advanced quotations will apply on second quarter business, for which sellers will open their books about the middle of the month.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to 3/4 x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to 3/4 x 6 in., 50 and 5 off; larger sizes, 60 and 5 off; hot pressed nuts, squares and hexagons, tapped, \$3.50 off; blank nuts, \$3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Sheets.—Second quarter commitments of local mills are now large enough to insure a good rate of operations until summer. Some seasonal tonnage has been placed, but in large part bookings represent material required for specific needs. The automobile industry, which is still operating at a high rate, continues to take an average of 35 per cent of the output of American sheet mills. The Japanese are expected to come into the market in due time for considerable quantities of sheets for use in their reconstruction program. Sheet prices are steady at the figures carried below, although shading has not entirely disappeared. All of the mills of the local independent, including those at its Milwaukee plant, are in operation.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago: 4c. for blue annealed; 4.70c. for black and 5.60c. for galvanized.

Cast Iron Pipe.—In general, the price situation is substantially unchanged, although increasing strength

is to be noted in the smaller sizes, in which pipe shops are booked ahead from two and one-half to four months. Business from both industrial and municipal sources is still in good volume. Among new projects the largest is 1750 tons for Berkley, Mich., a new suburb of Detroit. Recent lettings include:

Dubuque, Iowa, 600 tons to National Cast Iron Pipe Co.
Iowa City, Iowa, 400 tons to National Cast Iron Pipe Co.
Fond du Lac, Wis., 200 tons to American Cast Iron Pipe Co.

Pending business includes:

Berkley, Mich., 1750 tons, bids to be taken March 6.
White Fish Bay, Wis., 400 tons, March 3.

We quote per net ton, f.o.b. Chicago, as follows:
Water pipe, 4-in., \$60.20 to \$61.20; 6-in. to 10-in., inclusive, \$56.20 to \$57.20; 12-in. and above, \$55.70 to \$56.20; class A and gas pipe, \$5 extra.

Rails and Track Supplies.—The Nickel Plate has closed against its inquiry for tie plates, placing most of them, 3000 tons, with Chicago mills. The Pennsylvania inquiry for tie plates is still pending. Specifications against tie plate contracts have been unusually liberal during the week. The outlook for heavier buying of track supplies is regarded as favorable.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Wire Products.—Specifications from the jobbing trade continue to show a gradual increase, although they are still below expectations for this season. Jobbers have not given up their policy of buying in small lots for quick shipment. At the same time, bad road conditions in some of the agricultural States, such as Iowa and Missouri, are preventing the farmers from going to town to do their spring buying. The mills are still enjoying good business from manufacturing users. The operations of the leading interest average 80 per cent. For mill prices, which are unchanged, see finished iron and steel f.o.b. Pittsburgh, page 748.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, \$3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Structural Material.—Fabricating awards for the week aggregate 4600 tons, with a large tonnage of prospective work still pending. Four local hotel projects, the New Palmer House, the new Congress, the Stevens and an addition to the Morrison, involve a total of 50,000 tons. Bids on the general contract for the New Palmer House go in March 15. The Snelling-Mendota Bridge, Minneapolis, which, according to a structural steel design, involved 8100 tons, has been awarded to the Koss Construction Co., Des Moines, Iowa, which bid on the basis of an all-reinforced concrete design. An office building for the Michigan Bell Telephone Co. at Grand Rapids will require 900 tons of structural steel. The successful flotation of the Japanese loan has not yet resulted in orders for heavier rolled products for use in the reconstruction program in the earthquake zone. The deliberate policy of the Japanese is believed to be studied, calculated by the wily Orientals to engender greater solicitude for their business among American producers. It is unlikely, however, that local mills will go out of their way to share in this tonnage, as they are already comfortably obligated. Plain material is firm at 2.60c. Chicago.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Reinforcing Bars.—In view of the large amount of tonnage pending, lettings are comparatively light, and such business as is actually being placed is bringing out sharp competition. Although a number of bar distributors are holding to 3c., Chicago warehouse, quotations of as low as 2.75c. and in extreme cases even lower, are being made in some instances when the tonnage and the specifications involved are particularly attractive. The general contract for the Snelling-Mendota Bridge, Minneapolis, has been awarded to the Koss Construction Co., Des Moines, Iowa, which submitted a bid based on an all-reinforced concrete design. The bars, amounting to 3000 tons, will not be bought by the

contractor, but will be purchased by the municipality direct. Lettings include:

Union Stock Yards improvements, Omaha, Neb., 400 tons to Paxton-Vierling Co.

Power plant, Royalton, Minn., 350 tons to Kalman Steel Co.

United States Engineer's office, Milwaukee, harbor improvements, 336 tons (rail steel) to Calumet Steel Co.

Illinois State road work, 200 tons to Kalman Steel Co.

Great Northern Railroad, 200 tons to Kalman Steel Co.

State Hospital, Yankton, S. D., 125 tons to Joseph T. Ryerson & Son.

Addition to Boston Store wholesale house, Chicago, 100 tons to Concrete Engineering Co.

Pending work includes:

Snelling-Mendota bridge, Minneapolis, 3000 tons, general contract awarded to Koss Construction Co., Des Moines, Iowa.

Roberts Street bridge, St. Paul, Minn., 200 tons.

Western Shade Cloth Co. plant, Chicago, 300 tons, Lockwood, Greene & Co., architects.

Masonic Temple building, St. Louis, 300 tons, Westlake Construction Co., general contractor.

Union League Club building, Chicago, 200 tons, new bids to be taken.

Union Stock Yards Co., Chicago, two tanks, 175 tons.

Rock Island Lines, 100 tons for Silvis, Ill., shops.

Warehouse Prices.—Local warehouses have reduced galvanized sheet \$5 a ton to \$5.60 per 100 lb. This action was taken to meet a local competitive condition. New extras are expected to be announced on cold-rolled steel bars and shafting. These will conform with the new extras on hot-rolled bars put into effect last summer.

Coke.—Demand for coke has been stimulated by the increased consumption of local steel works. A large independent is now receiving deliveries of furnace coke at the rate of 250 tons per day, while the leading interest has placed an order for from 50,000 to 75,000 tons of by-product furnace coke. Demand for foundry coke is not pressing, but deliveries to melters are going forward at a steady rate. Local by-product foundry coke remains unchanged at \$12.50, delivered, Chicago switching district.

Old Material.—The market is soft and practically all grades have declined. A large steel works entered the market last week and succeeded in placing 15,000 tons of heavy melting at \$17.50 delivered. On the whole, consumer buying is at a minimum. Railroad offerings include the Northwestern, 3000 tons; the Pere Marquette, 1300 tons, and the New York Central, the Michigan Central and the Erie, blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	\$20.00 to \$20.50	
Cast iron car wheels	20.50 to 21.00	
Relaying rails, 56 and 60 lb.	26.00 to 27.00	
Relaying rails, 65 lb. and heavier ..	27.00 to 32.00	
Forged steel car wheels	20.50 to 21.00	
Railroad tires, charging box size ..	21.00 to 21.50	
Railroad leaf springs, cut apart ..	21.00 to 21.50	
Rails for rerolling	19.50 to 20.00	
Steel rails, less than 3 ft.	21.50 to 22.00	
Heavy melting steel	17.50 to 18.00	
Frogs, switches and guards cut apart	18.50 to 19.00	
Shoveling steel	17.25 to 17.75	
Drop forge flashings	13.00 to 13.50	
Hydraulic compressed sheets	15.00 to 15.50	
Axle turnings	19.50 to 20.00	
Steel angle bars	21.00 to 21.50	
Steel knuckles and couplers	21.00 to 21.50	
Coil springs	22.00 to 22.50	
Low phos. punchings	18.50 to 19.00	
Machine shop turnings	12.00 to 12.50	
Cast borings	15.00 to 15.50	
Short shoveling turnings	15.00 to 15.50	
Railroad malleable	21.50 to 22.00	
Agricultural malleable	20.50 to 21.00	

	Per Net Ton	
Iron angle and splice bars	20.00 to 20.50	
Iron arch bars and transoms	20.00 to 20.50	
Iron car axles	28.50 to 29.00	
Steel car axles	19.50 to 20.00	
No. 1 busheling	14.00 to 14.50	
No. 2 busheling	10.50 to 11.00	
Cut forge	15.50 to 16.00	
Pipes and flues	11.50 to 12.00	
No. 1 railroad wrought	14.50 to 15.00	
No. 2 railroad wrought	15.50 to 16.00	
No. 1 machinery cast	20.50 to 21.00	
No. 1 railroad cast	19.00 to 19.50	
No. 1 agricultural cast	19.00 to 19.50	
Locomotive tires, smooth	18.00 to 18.50	
Stove plate	17.00 to 17.50	
Grate bars	16.50 to 17.00	
Brake shoes	16.75 to 17.25	

New York

Car Builders Booked Well Ahead—Good Prospects in Finished Steel

NEW YORK, March 4.—In connection with an inquiry for 7000 tons foundry iron, for a Massachusetts melter, there has been much talk about low prices, but the company has not succeeded in buying much, if any, of the iron at prices below those recently prevailing; that is, \$22 for No. 2 plain, at Buffalo, and \$23, eastern Pennsylvania, for No. 2 plain. So little tonnage is pending that these prices have not been fully tested but they have shown some power of resistance. Melters catering to railroads are showing more active interest in the market. A shipment of 400 tons of Middlesbrough iron has come from England, but this tonnage was used as ballast and cannot be taken as indicating that more iron is likely to be imported. It is understood that a broker placed this iron at a low price. Continental quotations have advanced.

We quote delivered in the New York district as follows, having added to furnace price \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25....	\$26.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75....	25.77
East. Pa. No. 2, sil. 1.75 to 2.25....	25.27
Buffalo, sil. 1.75 to 2.25....	26.91
No. 2X Virginia, sil. 2.25 to 2.75....	31.44
No. 2 Virginia, sil. 1.75 to 2.25....	30.44

Ferroalloys.—Demand for ferromanganese continues only fair, confined in most cases to small lots. One British representative reports sales amounting to 1000 tons at \$107.50, seaboard, and others report moderate sales of small lots. They look for heavier demand in the near future as only a few consumers are understood to have covered their requirements beyond the first quarter. Imports of ferromanganese in January are returned at 1913 gross tons, or the smallest in over a year. There have been sales of a few lots of spiegel-eisen at \$38 to \$40, furnace, for the domestic product. The foreign alloy affects this market scarcely at all, as the supply is limited. Manganese ore imports in January are 23,081 tons. While still below the estimated requirements, these receipts are higher than recent months. No developments are noted in the ferro-silicon or ferrochromium markets.

Cast-Iron Pipe.—Purchasing by privately controlled water and gas companies is a large item in this district, but thus far tenders from municipalities for water pipe have been few, a condition that apparently does not prevail in other territories where an average number of municipal tenders has evidently been issued. Delivery is said to have been made on a substantial tonnage of cast-iron pipe recently purchased by a Portland, Me., interest from a British maker at about \$2 per ton under the domestic quotations. Prices continue unchanged, a range of \$2 per ton representing the quotations prevailing on small lots and large contracts. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$61.60 to \$63.60; 4-in. and 5-in., \$66.60 to \$68.60; 3-in., \$76.60 to \$78.60, with \$5 additional for Class A and gas pipe. Demand for soil pipe is light at present, with jobbers well stocked. Makers are well booked for spring delivery and discounts are firm. We quote discounts of both Southern and Northern makers, f.o.b. New York, as follows: 6-in., 29½ to 30¼ per cent off list; heavy, 39½ to 40¼ per cent off list.

Warehouse Business.—Sellers are holding quite firmly to quoted prices on practically all products. The recent advance in black and galvanized sheets seems to be holding better than was to be expected in view of the previous tendency to shade. It seems to be generally conceded that 4.85c. per lb. base on black and 5.85c. per lb. base on galvanized are about the minimum prices obtainable today. With most sellers from stock, February was about as good a month as January. Warehouses selling structural material report a fairly active demand for small lots. Wrought iron and steel pipe continues firm and a gradual increase in orders is noted for spring delivery. We quote prices on page 772.

Finished Iron and Steel.—Railroad car orders, which have been fairly heavy since the first of the year, were increased considerably by the orders just placed by the Pennsylvania Railroad for 12,000 car bodies. Car companies now have enough work on hand for six to nine months, and as there are more orders pending it is expected that the leading car builders will soon be filled up for the year. One large company has now on order two-thirds of its 1923 production. Structural steel work has shown a falling off so far as awards are concerned, but there is considerable work in prospect, some of which has not yet developed into definite inquiries. Railroad buying of bridges is expected shortly to develop into fairly large proportions. The general run of steel business in February, while not up to that of January in all lines, was fairly good, except in plates. The Eastern plate mills are not averaging more than a 50 per cent operation. Plates are the only steel product which show any marked weakness as to prices. On the current orders of a carload or more usual quotations are 2.30c. and 2.35c., Pittsburgh, but exceptional buyers, such as car and locomotive builders, are covering at \$2 or \$3 a ton under these figures.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates, 2.64c. to 2.74c.; structural shapes, 2.69c. to 2.74c.; bar iron, 2.74c.

Coke.—The market is quiet, but prices continue fairly firm at \$5.25 to \$5.75 per ton on standard foundry coke for prompt shipment and \$4.25 to \$4.50 per ton for standard furnace in carload lots. By-product is quoted at \$10.91, Newark and Jersey City, N. J.

Old Material.—The market is slightly weaker, dealers and brokers now paying \$17 to \$17.50 per ton, delivered eastern Pennsylvania consumers, for heavy melting steel. Stove plate is off slightly, a usual New Jersey consumer not being active at present and \$16 to \$16.50 per ton delivered Phoenixville about representing the market. Borings and turnings continue at \$14.50 to \$15 per ton delivered eastern Pennsylvania, while machine shop turnings are being purchased at \$15 per ton delivered. Specification pipe is inactive, dealers and brokers generally offering about \$16 per ton delivered to an eastern Pennsylvania consumer, which represents a further decline of 50c. per ton since last week.

Buying prices per gross ton New York follow:

Heavy melting steel, yard.....	\$13.00 to \$13.50
Steel rails, short lengths, or equivalent	13.75 to 14.25
Rolls for rolling.....	18.00 to 18.50
Relaying rails, nominal.....	25.00 to 26.00
Steel car axles.....	18.00 to 19.00
Iron car axles.....	25.00 to 26.00
No. 1 railroad wrought.....	16.50 to 17.00
Forge fire	11.50 to 12.00
No. 1 yard wrought, long.....	15.00 to 15.50
Cast borings (clean).....	11.25 to 11.75
Machine-shop turnings	11.75 to 12.25
Mixed borings and turnings.....	11.75 to 12.25
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	11.75 to 12.25
Stove plate	13.00 to 14.00
Locomotive grate bars.....	14.00 to 14.50
Malleable cast (railroad).....	16.00 to 17.00
Cast iron car wheels.....	16.50 to 17.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$20.00 to \$21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	15.50 to 16.50
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

A directory of sheet steel manufacturers published by the National Association of Sheet and Tin Plate Manufacturers has just come off the press. It lists the independent sheet companies and gives the officers, number of mills, annual capacity, the ranges of rolling limits and the products of each. Hot mills listed total 514, with an annual capacity of 3,484,900 net tons. Not listed hot mills number 165, with an annual capacity of 1,335,000 net tons. The total number of hot mills in the United States as of Jan. 1, 1924, the date of the publication, therefore, was 679, with an annual capacity of 4,819,900 net tons.

Buffalo

Moderate Buying of Pig Iron—Satisfactory Mill Specifications

BUFFALO, March 4.—The pig iron market shows little change over the last week. Buying has been moderate. One furnace interest took about 5000 tons of miscellaneous business, while another furnace took about 1500 to 2000 tons of scattered tonnage. Inquiry in the aggregate was about 15,000 tons, including one for 8000 tons of foundry from a Westfield, Mass., concern. The 10,000-ton inquiry noted last week appears to have been that of a group of heating apparatus manufacturers of Dunkirk and Utica. Reports that it had been placed have not yet been verified. General Electric Co., which was inquiring for 4000 tons, is believed to have placed this iron partly with Buffalo and partly with eastern Pennsylvania furnaces. Other inquiries this week include one for 1600 tons, one for 1000 tons and a number for scattered tonnages. Basic business of any tonnage had not been offered furnaces, though a small lot of 200 tons is said to have been sold at \$23 by a local furnace. Buffalo furnaces report that on New England business they are running into strong competition from the foreign furnaces, but on the other hand, Buffalo iron is being quoted generally throughout Ohio and some parts of Michigan at prices which brings it into strong competition with the furnaces of the locality. The price of No. 2 plain, sil. 1.75 to 2.25, continues at \$22 and it is doubtful if this price could be shaded by anything but a very substantial tonnage. In some cases it is believed buyers have been able to clip differentials to the extent of obtaining No. 2X for the same price and No. 1 for \$22.50, but furnace interests claim to be getting a good deal of their No. 2X business at \$22.50 and their No. 1 at \$23 to \$23.50.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25...	\$22.50 to \$23.00
No. 2 foundry, sil. 2.25 to 2.75...	22.00 to 22.50
No. 2 plain, sil. 1.75 to 2.25...	22.00
Basic	22.00 to 23.00
Malleable	22.00 to 23.00
Lake Superior charcoal	29.25

Finished Iron and Steel.—Though forward buying has not been as brisk as mills could wish, specifications throughout the week have been attractive and mills view the immediate future outlook as favorable. Mills selling a general line of bars, shapes, plates, billets, etc., say that their customers seem to average about 70 to 75 per cent plant operation. Bar business has shown some attractive lots specified, anywhere from single carloads up to 100 tons. Most of the bar inquiry is from jobbers and for assorted lots and an extensive range of sizes. Car companies here have not bought, most of their work at present consisting of repairs. Carbon steel billets and sheet bars are in strong demand, with the market firm. Some very attractive pipe specifications on butt-weld sizes have been had. The sheet market is active, with a good deal of 3.75c. business moving. Canadian business holds up but the influence of foreign competition is being felt by American mills. Foreign mills can lay down shapes in Toronto for 2.26c. The opening of navigation in Montreal is expected to heighten these conditions. Structural fabricating business is fair.

We quote warehouse prices, Buffalo, as follows:

Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—The weakness continues, with tendency toward lower prices. Not much business is going and some of the prices are nominal, but the trend is not upward. Mills generally have considerable stocks on hand, one large mill in particular which was understood to have been rather inactive, having assembled in small tonnages a substantial stockpile. Substantial tonnages of heavy melting steel placed at under \$19 have made the dealers holding out for \$20 out of line with the market. The situation has made some dealers very anxious to

unload and some "distress" tonnage has been taken by mills, with considerable concessions made by dealers. No. 1 bushelling has weakened and some sales have been made at about \$16. Machine shop turnings have been sold at around \$13 in fairly good-sized lots. Mixed borings and turnings can be purchased at about \$14.50.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel.....	\$18.50 to \$19.00
Low phos., 0.04 and under.....	23.00 to 24.00
No. 1 railroad wrought.....	16.00 to 17.00
Car wheels	20.50 to 21.00
Machine shop turnings.....	13.50 to 12.00
Cast iron borings.....	14.00 to 14.50
No. 1 bushelling.....	15.00 to 16.00
Stove plate	17.50 to 18.00
Grate bars	17.50 to 18.00
Bundled sheet stampings.....	14.00 to 14.50
Hydraulic compressed	18.50 to 19.00
Railroad malleable	22.00 to 23.00
No. 1 machinery cast.....	20.00 to 20.50

Birmingham

Lull in Pig Iron Buying Expected to Be Temporary—Cast Iron Pipe Active

BIRMINGHAM, ALA., March 3.—Lull in the pig iron market in the South indicates nothing, in the opinion of Southern leaders in the industry, who believe that before another week not only will there be more buying for the second quarter, but that numerous inquiries will be submitted for third quarter iron. Quotations have undergone no weakening, the range still being from \$23 to \$24, with the smaller companies asking for the highest price and selling about their make. The Sloss-Sheffield Steel & Iron Co., with four out of eight blast furnaces in operation, is almost out of the market, having covered well its probable make for the second quarter. This company has been asking \$23.50 per ton, No. 2 foundry, 1.75 to 2.25 per cent silicon. The Woodward Iron Co. has been on \$23 level for some time. The Alabama and Republic companies have been selling in small lots at \$24. What the 10,000 tons placed with the Central Iron & Coal Co. carried as to price is not stated. The melt in the home territory is showing steady increase, especially in the soil pipe circles.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25.....	\$23.00
Basic	23.00
Charcoal, warm blast.....	33.00

Cast Iron Pipe.—Both pressure and soil pipe makers have received additional lettings the past week, the latter reporting an activity which gives encouragement, recent advance of \$5 per ton not affecting the trade, in fact, intimation is heard that another advance is not improbable before long. Soil pipe prices are around \$60 per ton, standard sanitary pipe, while pressure cast iron pipe is quoted at \$48 to \$49 on the 6-in. and over. American Cast Iron Pipe Co. lettings for week include Rhinelander, Wis., 158 tons; Fargo, N. D., 177 tons; Evansville, Ind., 220 tons; Wausau, Wis., 150 tons. All large sized pipe plants are operating almost to capacity, while many of the soil pipe plants are in full operation and others more than 60 per cent.

We quote: 4-in. water, \$52 to \$53; 6-in., \$48 to \$49; larger sizes, \$47 to \$48; 4-in. gas, \$56; 6-in., \$52; standard sanitary pipe, \$55; heavy gage, \$45.

Finished Material.—While definite reports are not given out as to new business, indications, shown by operations, are that there are many orders on hand and being received for various steel products. Local fabricating plants are taking more steel. The rail, wire and nail mills are producing and shipping steadily. The Tennessee Coal, Iron & Railroad Co. will furnish more steel barges for the Federal barge service on the Warrior River, including 20 small barges suitable for iron and steel handling, iron and steel products. Steel bars are still 2.60c., Birmingham.

Coal and Coke.—Coal production in Alabama is about 365,000 tons per week, larger mining corporations reporting the trade active, small companies complaining and asserting need for orders. Coke production has not been improved any of late and quotations continue low,

by-product foundry coke from \$5 to \$6.50 and the bee-hive foundry coke from \$5.50 to \$6.50.

Old Material.—The scrap iron and steel market has also eased as far as selling goes, but deliveries are just as active as for the past few weeks. Quotations are weaker than for the past month, stove plate in particular losing \$1 the ton, \$15.50 being a good price. No. 1 cast also lost some of its strength. A few weeks ago dealers in old material had chances of selling into the third quarter of the year but would go no further than second quarter. Anticipations were that with an advancing pig iron market there would be a large amount of old material required. The lull is considered temporary and dealers are keeping a watch on their yards and preparing much material for future use.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical.....	\$16.00
Heavy melting steel.....	\$14.00 to 15.00
Railroad wrought.....	12.00 to 13.00
Steel axles.....	19.00 to 20.00
Iron axles.....	20.00
Steel rails.....	12.00 to 13.00
No. 1 cast.....	19.00 to 19.50
Tram car wheels.....	18.00 to 19.00
Car wheels.....	13.00 to 14.00
Stove plate.....	15.50 to 16.00
Machine shop turnings.....	7.00 to 9.00
Cast iron borings.....	9.00 to 10.00

St. Louis

Granite City Maker Sells 10,000 Tons of Basic Iron—Road Wants 40,000 Pairs of Angle Bars

ST. LOUIS, March 4.—The outstanding feature of the week in pig iron was the sale of 10,000 tons of basic by the Granite City maker to an East Side melter for shipment in April. The same maker also sold 3500 tons of wheel iron to an East Side melter for February and March delivery, and 750 tons of foundry iron in lots of carloads up to 300 tons. A most encouraging feature of business which indicates a heavier melt in the district is the anticipation of shipments against contracts. A South Dakota melter bought a carload of foundry iron, a Texas car wheel manufacturer bought 100 tons, and a Kansas City melter bought 250 tons of basic. The market remains firm, with the local maker quoting \$25.50 to \$26, Granite City; Northern iron at \$24.50, Chicago and Southern, \$24, Birmingham.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25.....	\$26.66
Northern malleable, sil. 1.75 to 2.25.....	26.66
Basic.....	26.66
Southern fdy., sil. 1.75 to 2.25 (rail).....	29.17

Finished Iron and Steel.—The only large inquiry in several weeks is for 40,000 pairs of angle bars for the Missouri Pacific Railway. Manufacturers of steel products are buying conservatively, and a good, steady business is reported, which is to the liking of the mills.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, $\frac{1}{4}$ -in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagons blank, \$2.50, and tapped, \$2.50 off list.

Coke.—The coke business is extremely dull. Especially is this true of domestic grades. By-product ovens in this district find it difficult to make sales, as dealers are well stocked and the weather is warmer. The market for foundry grades has eased.

Old Material.—American Steel Foundries added another furnace during the week, making two of three in operation, and there are other signs of increasing business among the consumers here and on the East Side. However, buying is still on a small scale. The impression is that consumers are holding off in an

attempt to beat down the prices. The Pennsylvania system is out with the first list since the departments of all regions were concentrated at Philadelphia; it is for 25,000 tons. Other lists of the week follow: Missouri Pacific, 3000 tons; United Railways of St. Louis, 2500 tons; Chicago & Alton, 1000 tons; Big Four Lines, blind list and Standard Oil Co., 350 tons.

Per Gross Ton

Iron rails.....	\$18.00 to \$18.50
Rolls for rolling.....	20.00 to 20.50
Steel rails, less than 3 ft.....	20.00 to 20.50
Relaying rails, 60 lb. and under.....	25.00 to 26.00
Relaying rails, 70 and over.....	32.50 to 33.50
Cast iron car wheels.....	21.50 to 22.00
Heavy melting steel.....	17.50 to 18.00
Heavy shoveling steel.....	17.00 to 17.50
Frogs, switches and guards cut apart.....	19.00 to 19.50
Railroad springs.....	21.50 to 22.00
Heavy axles and tire turnings.....	14.00 to 14.50

Per Net Ton

Steel angle bars.....	16.50 to 17.00
Steel car axles.....	21.00 to 21.50
Iron car axles.....	27.50 to 28.00
Wrought iron bars and transoms.....	22.00 to 22.50
No. 1 railroad wrought.....	16.50 to 17.00
No. 2 railroad wrought.....	16.00 to 16.50
Cast iron borings.....	11.00 to 11.50
No. 1 bushelings.....	15.50 to 16.00
No. 1 railroad cast.....	19.50 to 20.00
No. 1 machinery cast.....	19.50 to 20.00
Railroad malleable.....	17.00 to 17.50
Machine shop turnings.....	10.50 to 11.00
Champion bundled sheets.....	10.50 to 11.00

Boston

Requirements of Two Melters Hold Attention of the Pig Iron Trade

BOSTON, March 4.—Interest in pig iron the past week centered in the requirements of a Westfield, Mass., manufacturer and in the purchase of 1000 tons No. 1X, second quarter, by a Massachusetts textile machinery builder. The machinery maker is reported to have bought central Pennsylvania iron at a price equal to \$22 furnace, Buffalo. The Westfield concern probably will close on several thousand tons No. 2 plain today. Eastern Pennsylvania, Buffalo and New York State furnaces have solicited this business at price concessions. Pig iron buying otherwise is limited to minimum lots on which furnaces are maintaining prices. Two unimportant foundries have requested suspended iron deliveries due to closing of plants. Otherwise, the ratio of New England melt to foundry capacity is a little higher. February was more active than January with the average foundry. No foreign iron was received at this port in February.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75.....	\$26.65 to \$27.15
East. Penn., sil. 1.75 to 2.25.....	26.15 to 26.65
Buffalo, sil. 2.25 to 2.75.....	27.41 to 28.41
Buffalo, sil. 1.75 to 2.25.....	26.91 to 27.91
Virginia, sil. 2.25 to 2.75.....	31.42 to 32.42
Virginia, sil. 1.75 to 2.25.....	30.92 to 31.92
Alabama, sil. 2.25 to 2.75.....	33.10 to 34.10
Alabama, sil. 1.75 to 2.25.....	32.60 to 33.60

Cast Iron Pipe.—A fairly heavy tonnage of pipe for first half delivery has been placed in this territory recently on private transactions with price concessions less frequent than heretofore. In addition, the Donaldson Iron Co. has been awarded 200 tons by Framingham, Mass., and the Warren Foundry & Pipe Co. 300 tons of 3-in. and 4-in., in six-foot length by Boston.

Finished Material.—At least three mills have offered plates at 2.30c., Pittsburgh base, in this territory, as compared with 2.35c., the previous low price. The market for shapes is easier in view of the fact that 2.40c., Pittsburgh, is now quoted more often than 2.50c. The market for wire products is unsettled with prices in the buyer's favor. Prices on bars, for which there is a good demand, hold steady. Only one sizable tonnage of structural steel, 1500 tons, was let here the past week. Approximately 3100 tons, for three jobs, probably will

close within a few days, and a still larger tonnage before the end of March.

Soft steel bars, \$3.51½ per 100 lb. base; flats, \$4.40; plain and deformed concrete bars, \$3.76½; small angles, channels and tees, \$3.51½; structural steel, large angles and beams, \$3.61½; tire steel, \$4.80 to \$5.15; open-hearth spring steel, \$5 to \$8; crucible spring steel, \$12; steel bands, \$4.31½ to \$5.20; hoop steel, \$5.80 to \$6.30; cold rolled steel, \$4.35 to \$4.85; toe calk steel, \$6.15; heavy plates, \$3.61½; light plates, \$3.86½; diamond pattern plates, stock sizes, \$5.90; blue annealed sheets, \$4.51½; refined iron bars, \$3.51½; best refined iron bars, \$4.75; Wayne, \$5.50; Norway rounds, \$6.60; Norway squares and flats, \$7.10.

Coke.—The Providence Gas Co., Providence, R. I., followed by the New England Coal & Coke Co. have announced that specifications against first half by-product foundry coke contracts, March shipments, will be on a basis of \$12.50 a ton delivered in New England, the same price existing previously this year. Both oven interests report freer specifications, indicating increased activity among foundries in general, with an occasional call for emergency fuel. New England foundries display little or no interest in Connellsville foundry coke at any price. The domestic coke market was materially strengthened in February, although surplus stocks are still noted at ovens.

Old Material.—The old material market has developed into a brokers' affair. Business is largely composed of small tonnages of a limited number of materials, representing the completion of old contracts. Machine shop turnings lead in activity with prices off 50c. a ton. Very little steel is changing hands. Chemical borings are scarce and higher on odd carlot purchases. The withdrawal of a local nail manufacturer from the cast iron borings market has caused slightly easier values. Small tonnages of pipe figure in recent transactions at \$11.50 to \$12 on cars, although 50c. a ton better has been done. Machinery cast, stove plate and malleable are inactive, but firm. Scrap importations last month were 1376 pieces of car wheels from Cuba.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$22.00 to \$23.00
No. 2 machinery cast.....	19.50 to 20.50
Stove plates.....	16.00 to 16.50
Railroad malleable.....	19.00 to 20.00

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$12.50 to \$13.50
No. 1 railroad wrought.....	14.50 to 15.00
No. 1 yard wrought.....	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long).....	12.00 to 12.50
Machine shop turnings.....	10.50 to 11.00
Cast iron borings, chemical.....	12.50 to 13.00
Cast iron borings, rolling mill.....	11.00 to 11.50
Blast furnace borings and turnings.....	10.50 to 11.00
Forged scrap and bundled skeleton.....	10.50 to 11.00
Shafting.....	17.50 to 18.00
Street car axles.....	17.50 to 18.00
Rails for rolling.....	14.50 to 15.00

Cincinnati

Pig Iron Dull with Prices Stationary—Some Activity in Scrap

CINCINNATI, March 4.—The pig iron market was exceptionally dull during the past week, the total tonnage reported being approximately 1000. Sales were confined almost entirely to carload lots, though we note one sale of 400 tons of foundry and one of 300 tons of silvery. The price range in the Ironton and Southern districts is unchanged from the previous week, southern Ohio being \$23.50 to \$24, while Southern iron is \$22.50 to \$23. A small tonnage of Buffalo iron was sold in the northern part of the State last week on the basis of \$22, furnace. Inquiry is light, one being for 400 tons of low phosphorus, and one for 400 tons of foundry. Basic and Bessemer grades are inactive. Shipments, however, are heavy, and in some cases furnace yard stocks are being lifted.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	\$26.55 to \$27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft).....	27.05 to 27.55
Ohio silvery, 8 per cent.....	35.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2).....	25.77 to 26.27
Basic Northern.....	25.27
Malleable.....	25.77 to 26.27

Sheets.—While there is no rush to cover for second quarter, a number of contracts at the full schedule have been placed. The demand for automobile body sheets continues good, and mills in this district report capacity booked through the middle of May. Price shading continues, and for immediate shipments, 3.75c. for black and 4.90c. for galvanized can be done.

Structural Activity.—There is little activity, and new inquiries and lettings are light. The L. & N. Railroad has awarded general contract for a freight house at Covington, Ky., to George H. Rommel Co., Louisville. The C. L. & N. Railroad, Pennsylvania subsidiary, has taken bids on a freight house at Cincinnati, 250 tons, and an award is expected this week. The Union Trust Co., and the Coal Exchange Building, Huntington, W. Va., will probably be awarded this week, as bids will be opened Monday and Wednesday respectively. It is reported that revised plans for the Knights of Columbus building at Columbus, Ohio, will be issued, and new bids taken.

Reinforcing Bars.—The demand for reinforcing bars is very good. An Eastern contractor is asking for bids on 250 tons for delivery at Piqua, Ohio; bids will be opened March 11 for a U. S. Veterans' Bureau Hospital at Pikeville, Ky., 150 tons. A number of other projects are expected to come out, including the Alms Hotel, Cincinnati, and the Heyburn office building, Louisville, Ky. Plans for the new Jefferson Co. Tuberculosis Hospital at Louisville, Ky., have been completed, and bids will be taken shortly. The U. S. Engineers' Office, Louisville, has awarded 140 tons to the Bourne-Fuller Co., and it is reported that 940 tons required for the Standard Sanitary Mfg. Co. building will be supplied by a New Albany, Ind., mill. Prices of reinforcing bars are strengthening, and 2.30c. for new steel is now minimum quotation, with a quotation of 2.40c. mill being made by the larger producers. On hard steel 2.20c. is minimum.

Warehouse Business.—Jobbers report business light last week, though indications point to a better month in March. Cold-rolled steel has been in fair demand, as has reinforcing bars and light angles. Wire products are moving fairly well. Prices are being maintained.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, \$3.60 per 100 lb.; common wire nails, \$3.50 per keg base; cement coated nails, \$3.30 per keg.

Finished Materials.—The week has been rather quiet for the heavier products, such as bars, shapes and plates, the general attitude of buyers continuing to be to buy only for immediate needs. As a result carload buying has been the rule. Prices are fairly steady. Plates can be had at 2.40c., Pittsburgh, from a number of mills, and some reports are current that 2.35c. has been done on an order for 300 tons. Shape and bar prices, however, are being maintained at 2.50c. and 2.40c. respectively. Wire products are in improved demand, especially manufactured wires. On wire nails, Ohio River mills are taking practically all the business in this district at \$3 per keg, base, mill, though some of the Pittsburgh district independents are equalizing the rate. Hoops and bands are in good demand, a number of inquiries for second quarter tonnages being current. While the 3c. price is holding fairly well with the larger producers, it is said that 2.90c. can be done, and it is reported that a second quarter contract has been negotiated at 2.85c. There are also reports of price cutting on cold-rolled bars and strips in the Michigan territory, but in this district 3c. appears to be the minimum on cold-rolled bars at the present time.

Coke.—Demand for foundry coke continues, though sales are of the carload variety for quick shipment. Connellsville furnace coke is up 15c. to \$4.15, with foundry unchanged. In Wise County, furnace coke has been sold at \$4.50, though foundry grades are fairly steady. New River foundry and by-product fuels are unchanged at \$11 and \$8 respectively.

Connellsville furnace, \$4.15; foundry, \$5; New River foundry, \$11; Wise County furnace, \$4.50; foundry, \$5.50; by-product foundry, \$8, Connellsville basis.

Old Material.—There was a fairly active scrap market last week, and one interest is credited with selling 6000 tons of various grades. We note a sale of 1000 tons of borings, and one of 1000 tons of sheet clippings. Mills in the district are sounding out the market on heavy melting steel and have indicated they are prepared to take up bargain lots. Prices are lower on some grades and unchanged on others. The Big Four has a small list out, about 2500 tons, and the Chesapeake & Ohio is offering approximately 12,000 tons.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel.....	\$16.50 to \$17.00
Scrap rails for melting.....	16.00 to 16.50
Short rails.....	20.50 to 21.00
Relaying rails.....	30.50 to 31.00
Rails for rolling.....	18.00 to 18.50
Old car wheels.....	15.50 to 16.00
No. 1 locomotive tires.....	16.50 to 17.00
Railroad malleable.....	18.50 to 19.00
Agricultural malleable.....	17.50 to 18.00
Loose sheet clippings.....	12.00 to 12.50
Champion bundled sheets.....	13.00 to 13.50
Per Net Ton	
Cast iron borings.....	11.50 to 12.00
Machine shop turnings.....	10.50 to 11.00
No. 1 machinery cast.....	20.50 to 21.00
No. 1 railroad cast.....	17.00 to 17.50
Iron axles.....	23.50 to 24.00
No. 1 railroad wrought.....	13.00 to 13.50
Pipes and flues.....	10.00 to 10.50
No. 1 busheling.....	11.50 to 12.00
Mixed busheling.....	9.50 to 10.00
Burnt cast.....	12.50 to 13.00
Stove plate.....	12.50 to 13.00
Brake shoes.....	13.50 to 14.00

Cleveland

Pig Iron Market Very Dull—Fair Orders for Finished Materials

CLEVELAND, March 4.—The pig iron market has been quieter the past week than for a long time. Sales were limited to small lots, none larger than 300 tons, and new inquiry is very light. The market lacks strength in the Valley district, where \$24 seems no longer more than an asking price for foundry and malleable iron. Small lot sales are reported at \$23.50, but \$23 is the more common price. Locally the market is firm at \$24 for Cleveland delivery, at which some business was booked during the week, but for out-of-town shipment a local producer is meeting the \$23 Valley price. One lake furnace that comes in competition with the Valley district to only a limited extent is holding firmly to \$24. Buffalo foundry iron is being offered at \$22 both for No. 2 and No. 2X. Most large consumers are covered for the second quarter, but many small foundries have not yet bought iron for that delivery. The most encouraging aspect of the present situation from the viewpoint of the producers is that the melt continues heavy. Most producers shipped more iron than they made in February and present shipping orders indicate that consumption will be just as heavy through March. The Hanna Furnace Co. blew out one Detroit furnace Feb. 29 for relining.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace.....	\$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25.....	24.50
Southern fdy., sil. 1.75 to 2.25.....	\$29.00 to 30.00
Malleable.....	24.50
Ohio silvery, 8 per cent.....	36.52
Standard low phos., Valley furnace.....	29.00 to 30.00

Iron Ore.—The Ford Motor Co. has sent out an inquiry for 250,000 tons of ore which together with the output of its Imperial mine will cover its 1924 requirements. This inquiry, in addition to being received by the leading ore selling agencies, has come to many of the small mining companies that sell their own ore and do not always adhere to the prices named by leading producers. While ore prices have not been established

for the season, some of the leading companies have already quoted on the Ford inquiry. Information is not available as to what these prices are, but with the keen competition of the small mining companies, quotations may have been made lower than the regular market prices to be established later. Other consumers are beginning to take an interest in the ore market to the extent that they would like to know what prices for the season will be. There is some talk of reaffirming last season's prices. So far, opinion does not seem to have been crystallized on probable prices. A few weeks ago ore interests did not look for an ore movement of over 50,000,000 tons during 1924, but with the increased blast furnace operations in the last few weeks it is now predicted that the movement will reach approximately 60,000,000 tons or about the same as last year. It has developed that some of the leading producers have not committed themselves on the Ford inquiry. They made proposals subject to prices to be established later.

Sheets.—Little activity has yet developed in second quarter contracts, for which most mills have opened their books. While some business in automobile body sheets is being placed, buyers are not rushing into the market for their full second quarter requirements. The current demand for other grades is fair, but some mills need orders for early rolling and others have stocks in considerable quantities to dispose of. Prices appear fairly firm except on black sheets, on which 3.75c. is still being quoted.

Bolts, Nuts and Rivets.—Current orders for bolts and nuts show a gain and specifications on contracts are good. Prices are firm at regular quotations. While the demand for rivets shows a slight improvement, it is still light. The market is holding steady at 2.75c. for large rivets.

Semi-Finished Steel.—The leading local producer has closed a contract for 20,000 to 25,000 tons of semi-finished steel per month for the second quarter, subject to quoted prices, converting previous reservations into contracts. The same producer has adjusted prices for March shipment on similar contracts at \$42.50 for sheet bars and \$40 for billets and slabs. A number of other inquiries for second quarter contracts have come out and indications are that present prices will prevail.

Finished Iron and Steel.—Mills are getting a fair amount of business, mostly in small orders, the volume showing little change in comparison with the few previous weeks. Consumers, as a rule, are buying only for early requirements and inquiries for second quarter contracts so far have not been numerous, although some business in steel bars for that delivery was placed during the week. Steel bars are firm at 2.40c., at which the second quarter business was placed. Plates continue weak and in rather light demand. In this territory, 2.40c. is still the minimum quotation and some mills are still able to take car lot business at 2.50c. The regular 2.50c. price on structural material appears to be maintained. Inquiry in the building field is light. An inquiry has appeared for 1500 tons of plates for the blast furnace of the Central Steel Co., Massillon, Ohio, but this seems to have been sent out for estimating purposes, as no contracts have as yet been placed. A portion of the plates for the 40 locomotives placed by the New York Central Railroad with the Lima Locomotive Co., together with wheels and axles, have been placed with a Pittsburgh district mill, but the fire box plates have not yet been purchased. Lake shipyards have pending inquiries for four boats, one of which may be placed shortly. One Ohio strip mill has opened its books for wide hot-rolled strip steel for the second quarter at 2.75c., the current price for wide strip, and has booked some business at that price. Hoops and bands are firm at 3c. Alloy steel is in fair demand from the automotive industry and Ohio mills are well filled with orders for six to eight weeks.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.75c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, \$3.50 per 100 lb.; No. 9 galvanized wire, \$3.95 per 100 lb.; common wire nails, \$3.60 base per 100 lb.

Coke.—One or two producers have reduced prices on foundry coke 25c. a ton, but others are adhering to old prices. The demand is very slow, for the foundries are buying only for their early requirements. Quotations on standard Connellsville foundry coke range from \$5 to \$6.50.

Old Material.—Prices have further declined 25c. to 50c. a ton on most grades and the tendency of the market is still downward. Mills are not buying and are showing no interest in offerings at lower prices that have been prevailing. Scrap produced in March by the Detroit automobile companies and the railroad offerings are expected to result in considerable material coming on the market this week. Locally dealers have been able to buy heavy melting steel at \$18.25. In the Valley district this grade is now quoted at \$20 or a decline of about \$1 a ton during the week.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$18.25 to \$18.50
Rails for rolling.....	19.00 to 19.25
Rails under 3 ft.....	20.25 to 20.75
Low phosphorus melting.....	20.50 to 20.75
Cast borings.....	14.75 to 15.00
Machine shop turnings.....	14.50 to 14.75
Mixed borings and short turnings.....	14.25 to 14.50
Compressed sheet steel.....	16.25 to 16.50
Railroad wrought.....	15.00 to 15.25
Railroad malleable.....	20.75 to 21.00
Light bundled sheet stampings.....	13.00 to 13.50
Steel axle turnings.....	15.50 to 15.75
No. 1 cast.....	21.00 to 21.50
No. 1 busheling.....	13.25 to 13.50
Drop forge flashings.....	13.00 to 13.25
Railroad grate bars.....	17.25 to 17.50
Stove plate.....	17.25 to 17.50
Pipes and flues.....	12.50 to 12.75

Detroit Scrap Market

DETROIT, March 4.—The lower prices for scrap have resulted in more expensive purchases by consumers. Although the volume is not large, a leading automobile manufacturer realized good prices on about 2000 tons of assorted grades during the week.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel.....	\$17.00 to \$17.50
Shoveling steel.....	16.75 to 17.25
Borings.....	12.00 to 13.00
Short turnings.....	12.00 to 13.00
Long turnings.....	10.50 to 11.00
No. 1 machinery cast.....	17.00 to 17.50
Automobile cast.....	24.00 to 25.00
Hydraulic compressed.....	15.00 to 16.00
Stove plate.....	14.00 to 15.00
No. 1 busheling.....	12.00 to 12.50
Sheet clippings.....	11.00 to 11.50
Flashings.....	12.50 to 13.50

Bethlehem-Midvale Merger Hearing

Witnesses at last week's hearings of the Federal Trade Commission in the Bethlehem-Midvale steel merger were John B. Carse of Ogden & Wallace, New York; R. B. Baker, Endicott Forging & Mfg. Co., Endicott, N. Y.; Ralph L. Dickey, New York Wire & Spring Co., Hoboken, N. J.; Peter Igoe, Igoe Brothers, Newark, N. J. The hearings are being continued this week at the Federal Building, Broadway and Park Place, New York.

An error was made in the report of the hearing published in THE IRON AGE of Feb. 28 in stating that Patriarche & Bell, New York jobbers, had been known as "Cambria distributors." This statement referred to another New York jobbing house and not to Patriarche & Bell.

Lawrence W. Wallace, Washington, executive secretary of the American Engineering Council, has been re-elected president of the Eye Sight Conservation Council of America, Times Building, New York. Guy A. Henry of New York will continue to administer the general affairs of the council as general-director. The council, among the principal activities of which is research, is working with the American Engineering Standards Committee in the preparation of a national lighting code.

Philadelphia

Pennsylvania Railroad Orders for 12,000 Car Bodies Only Feature of Market

PHILADELPHIA, March 4.—The distribution of orders for 12,000 steel box car bodies by the Pennsylvania Railroad has encouraged the Eastern steel trade, although only a small part of the steel will be furnished by Eastern mills. It is the only feature of a rather colorless market. The demand for steel products is steady, but largely confined to small lots, the conservative attitude of buyers showing no tendency toward change. The price and delivery situation remaining easy, buyers see no incentive for anticipating their requirements for more than a few weeks. Plates and shapes continue weak, both products now being available at 2.30c. and 2.35c., Pittsburgh. The pig iron and scrap markets are exceedingly quiet.

Pig Iron.—Consumers are apparently well covered and there is no demand of importance for pig iron. Nor is there any great pressure to sell, most of the eastern Pennsylvania furnaces having good order books. Two of the important producers are practically out of the market, accepting only carload lots from regular customers. Quotations are usually \$23, furnace, for No. 2 plain, \$23.50 for No. 2X and \$24 for No. 1X. If concessions from these prices are offered it will be only on tonnage more important than any which has developed in the past week. While foreign foundry iron is not competing seriously with domestic iron, foreign low phosphorus iron is being offered at such low prices that domestic furnaces are finding competition difficult in this district. The foreign grade is freely offered at \$26, f.o.b. cars Philadelphia. The only foreign iron received here last week was 1000 tons from Scotland.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.....	\$23.76 to \$24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.....	24.26 to 24.63
East. Pa. No. 1X.....	24.76 to 25.13
Virginia No 2 plain, 1.75 to 2.25 sil.....	30.17 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.....	30.67 to 31.67
Basic delivery eastern Pa.....	22.75 to 23.50
Gray forge.....	22.50 to 23.00
Malleable.....	23.75 to 24.25
Standard low phos. (f.o.b. furnace).....	27.00 to 27.50
Copper bearing low phos. (f.o.b. furnace).....	27.00 to 28.00

Ferroalloys.—German ferromanganese has been offered at \$105 and \$106, seaboard, but so far as known no important sales have been made. British and domestic makers continue their quotations of \$107.50, seaboard or furnace.

Billets.—Demand for billets is light. Prices are unchanged at \$40, Pittsburgh, for rerolling quality and \$45 for forging quality.

Plates.—Eastern plate mills continue to operate at about 50 per cent in their finishing departments, although open-hearth operation is not up to this rate because of the large stocks of cold steel the mills have on hand. Very little, if any, of the 100,000 tons of light plates and blue annealed sheets required for the Pennsylvania car bodies will be rolled by Eastern mills. Most of it will be furnished by the Carnegie and Illinois companies of the Steel Corporation. The plate price situation shows no sign of strengthening. Ordinary lots from a carload upward now command a price of 2.30c., Pittsburgh, and 2.35c. is usually obtainable only in less than carload lots.

Structural Material.—Competition for orders for plain material continues keen, as mills need certain sizes to round out rolling schedules. Carload lots are being sold freely at 2.35c., Pittsburgh, while on unusual tonnages 2.30c., Pittsburgh, has been frequently quoted.

Orders of the past week have been mostly of small size.

Bars.—The situation on bars is that 2.30c., Pittsburgh, is being quoted on concrete reinforcing material, 2.35c. is quoted to preferential buyers of merchant steel, and 2.40c. is the usual quotation to the smaller and infrequent buyers. Demand is fair, although orders are small.

Sheets.—A leading Eastern maker of blue annealed sheets is operating at about 65 per cent. Buyers are not anticipating and few second quarter contracts have been made. Concessions of \$2 a ton are still being offered by certain mills.

Ore.—Imports of ore last week included 5020 tons of iron ore from French Africa and 6000 tons of chrome ore from Portuguese Africa.

Warehouse Business.—Demand for steel products out of stock has increased in volume within the past week or two. Prices are unchanged, for local delivery being as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, $1\frac{1}{2} \times \frac{1}{2}$ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, $\frac{1}{4}$ in. and heavier, 3.57c.; tank steel plates, $\frac{1}{2}$ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, $\frac{1}{4}$ -in., 5.40c.; $\frac{1}{2}$ -in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to $\frac{1}{4}$ -in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—Prices of nearly all grades of scrap have declined further within the past week. Heavy melting steel shows a range from \$17 to \$18, delivered, the lower price having been paid in a few instances and is the current offer by a leading broker for delivery to a large Eastern plant. Two of three eastern Pennsylvania mills are offering \$17.50 for small lots and in one or two instances \$18 is being paid by brokers on old orders, which were taken at \$19 to \$20. Scrap is still in liberal supply and some mills have had to hold up shipments because of their inability to handle the large number of cars coming to them.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$17.00 to \$18.00
Scrap rails	17.00 to 18.00
Steel rails for rolling.....	20.00 to 21.00
No. 1 low phos., heavy 0.04 and under	23.00 to 24.00
Couplers and knuckles.....	21.00 to 22.00
Cast-iron car wheels.....	19.00 to 20.00
Rolled steel wheels.....	21.00 to 22.00
No. 1 railroad wrought.....	19.00 to 20.00
No. 1 yard wrought.....	17.50 to 18.50
No. 1 forge fire.....	14.50 to 15.00
Bundled sheets (for steel works)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use).....	14.50 to 15.00
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use).....	15.00 to 15.50
Heavy axle turnings (or equivalent)	15.50 to 16.00
Cast borings (for steel works and rolling mills).....	15.00 to 15.50
Cast borings (for chemical plants)	18.00 to 18.50
No. 1 cast.....	19.00 to 20.00
Heavy breakable cast (for steel plants).....	17.00 to 18.00
Railroad grate bars.....	16.50 to 17.00
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	17.50 to 18.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 16.50
Shafting	22.00 to 23.00
Steel axles	22.00 to 23.00

An examination will be held throughout the country on April 9 and 10 to fill vacancies in the Coast and Geodetic Survey, for duty in Washington and for duty in Manila. Information and application blanks may be obtained from the United States Civil Service Commission, Washington, or the secretary of the board of United States civil-service examiners at the post office or customhouse in any city.

Large Number of Accidents Incurred in Handling Material

That approximately one-fourth of all industrial accidents in a typical manufacturing State are due to handling of material was stated by D. S. Beyer, vice-president Liberty Mutual Insurance Co., Boston, in a "Study in Fatal Accidents in Material Handling," given at the joint meeting of the engineering section, National Safety Council and American Society of Safety Engineers, held in New York, Jan. 22.

The report of the Massachusetts Industrial Accident Board covering all accidents in the State for the year ending June 30, 1922, was cited. This report shows that out of 51,105 accidents during the year, 14,916 or 29 per cent were incurred in handling material. The accidents were responsible for a loss of 449,469 days (excluding deaths) or 20 per cent of the total, and 19 or 6.2 per cent of the 306 deaths during that period.

A large volume of accident data tabulated by the Pennsylvania Compensation Rating and Inspection Bureau was also referred to, this showing 22 per cent of accidents due to handling material.

Referring to the Massachusetts accidents, those caused by strains numbered about 5000 or 30 per cent, which was emphasized as suggesting that men are being called upon to lift loads that are too heavy to handle with safety. An analysis of several hundred cases by Mr. Beyer's company was said to show that hernia resulted in one-third of the total cases of strains reported, death following in several cases.

There were 3366 persons, or 23 per cent, injured on sharp or rough objects, and 2217 or 15 per cent, by objects dropped. Those caught between objects handled and other objects, numbered over 1450 or 10 per cent and injuries in using hand trucks, wheel barrows, etc., were 1090 or 7 per cent. Objects falling from the load and from the pile caused 614 or 4 per cent and 118 or 1 per cent, respectively, of the total accidents. There were 1557 accidents from miscellaneous causes.

Among lessons said to be learned from the study was the important place which the foremen holds in such work. The use of mechanical appliances wherever they can be adopted, for handling heavy weights was stressed, as well as frequent inspection of such appliances in use to see that they are not permitted to get out of order or to be used improperly.

The necessity for selecting the man for the job, so that individuals with heart trouble or other organic weakness will not be placed on jobs where this weakness may endanger their lives was also given.

Doehler Die-Casting Patents Sold to Foreign Manufacturers

European patents covering Doehler castings in aluminum and brass have been transferred by the Doehler Die Casting Co. of Brooklyn, terminating negotiations which have been in process for nearly a year. The Doehler company is the largest manufacturer of die castings in this country, and specializes in castings produced under processes developed by H. H. Doehler, president of the company.

Manufacturing rights in Germany were sold to Stinnes interests and the Hirsch, Kupfer & Messingwerke of Germany. It is understood that the deal was consummated by the son of Hugo Stinnes on his recent visit to the United States. English rights have been sold to Ferman's, Ltd.; French rights to Edouard Vaud of Lyons, France; Swiss rights to the Injector Co., and Italian rights to the Fiat Co., motor car manufacturer.

Application will be made for listing the stock of the Doehler company on the New York Stock Exchange this week, and in this connection a plan of recapitalization has been made, whereby the 10,000 shares of \$50 par shall be exchanged for 150,000 shares of no par value. Plants were recently acquired at Batavia, N. Y., and Pottstown, Pa., in addition to the one at Toledo, Ohio. Last year's business was the largest in the company's history and present bookings give promise of a good volume in the current year.

MORE ACTIVE STACKS

Increase of Six Furnaces in Blast in Pittsburgh and Nearby Districts

PITTSBURGH, March 4.—There has been a further net gain of six blast furnaces in production in the Pittsburgh and nearby districts in the past month, making a total increase since the end of 1923 of 18, January having scored a net gain of 12 stacks. Of the total of 140 furnaces in the area bounded by Johnstown and Erie, Pa., Dover, Ohio, and Wheeling, W. Va., 110 now are in operation, as against 104 a month ago and 92 at the end of 1923. Twelve merchant furnaces out of a total of 23 are in production and 98 out of 117 steel works furnaces are active. The record of furnaces in and out as of March 3, compares with that of Feb. 5, as follows:

Pittsburgh District Steel Works Furnaces					
	Total	March 3		Feb. 5	
		In	Out	In	Out
American Steel & Wire Co.					
Donora	2	1	1	1	1
Shoenberger	2	2	0	2	0
Carnegie Steel Co.					
Carrie	7	7	0	7	0
Clairton	3	3	0	3	0
Duquesne	6	5	1	5	1
Edgar Thomson	11	11	0	10	1
Edith	1	0	1	0	1
Isabella	3	3	0	3	0
Lucy	2	2	0	2	0
Neville	1	1	0	1	0
Jones & Laughlin Steel Corporation					
Alliquippa	5	4	1	5	0
Eliza	6	5	1	5	1
Soho	1	1	0	0	1
National Tube Co.	4	4	0	4	0
Pittsburgh Crucible Steel Co.	2	2	0	2	0
Pittsburgh Steel Co.	2	1	1	1	1

Merchant Furnaces					
Clinton Iron & Steel Co.	1	0	1	0	1
Total	59	52	7	51	8

Mahoning & Shenango Valley Districts Steel Works Furnaces					
Carnegie Steel Co.					
Farrell	3	2	0	3	0
New Castle	4	3	1	3	1
Niles	1	0	1	0	1
Ohio	6	6	0	6	0
Sharon	1	0	1	0	1
Republic Iron & Steel Co.	7	5	2	4	3
Sharon Steel Hoop Co.	1	1	0	1	0
Trumbull Cliffs Furnace Co.	1	1	0	1	0
Youngstown Sheet & Tube Co.	9	9	0	7	2

Merchant Furnaces					
A. M. Byers Co.	1	1	0	1	0
Hanna Furnace Co.					
West Middlesex	1	0	1	0	1
Letonia, Ohio	1	1	0	1	0
Dover, Ohio	1	1	0	1	0
Reliance Coke & Furnace Co.					
West Middlesex, Pa.	1	0	1	0	1
Sharpsville, Pa.	1	0	1	0	1
McKeesport Iron Co.	1	0	1	0	1
Sharpsville Furnace Co.	1	0	1	0	1
Shenango Furnace Co.	2	2	0	1	1
Struthers Furnace Co.	1	1	0	1	0
Stewart Furnace Co.	1	1	0	1	0
Valley Mold & Iron Corp.	1	0	1	0	1
Total	46	35	11	31	15

Western Pennsylvania Steel Works Furnaces					
Bethlehem Steel Co., Johnstown, Pa.	11	7	4	6	5
Merchant Furnaces					
Adrian Furnace Co.	1	1	0	1	0
American Manganese Mfg. Co.	2	0	2	0	2
Kittanning Iron & Steel Mfg. Co.	1	0	1	0	1
McKinney Steel Co.					
Scottdale, Pa.	1	1	0	1	0
Josephine, Pa.	2	2	0	2	0
Perry Furnace Co.	1	0	1	0	1
Punxsutawney Furnace Co.	1	1	0	1	0
Total	20	12	8	11	9

Wheeling District Steel Works Furnaces					
Carnegie Steel Co.					
Bellaire, Ohio	2	2	0	2	0
Mingo, Ohio	4	3	1	3	1
Steubenville, Ohio	1	0	1	0	1
National Tube Co.	2	2	0	2	0
Wheeling Steel Corporation	5	3	2	3	2
Weirton Steel Co.	1	1	0	1	0
Total	15	11	4	11	4
Grand total	140	110	30	104	36

First Annual Report of the Jones & Laughlin Steel Corporation

The first annual report of the Jones & Laughlin Steel Corporation, which succeeded the Jones & Laughlin Steel Co. on Jan. 1, 1923, shows net income for the year ended Dec. 31, 1923, of \$10,913,878. The report in detail follows:

Net Earnings	\$16,727,176
Depreciation and depletion	4,746,868
Interest	1,066,430
Net income	10,913,878
Preferred dividends	3,879,873
Surplus adjustments	610,350
Final surplus for year	6,423,655
Previous surplus	24,384,620

Total surplus.....\$30,808,275

The balance sheet shows current assets of \$71,685,471 and current liabilities of \$9,731,944. The balance sheet follows:

Assets	
Real estate, plants, mines, steamships, rolling stock, etc. (Net)	\$105,810,736
Bonds and stocks of other companies	865,201
Real estate sales contracts and mortgages and due on sales of preferred stock to employees	1,702,484
Accident compensation, fire insurance and pension system fund assets	1,350,384
Current Assets:	
Cash on hand	\$11,856,764
U. S. Government obligations	23,240,900
Accounts receivable	3,048,053
Bills receivable	569,608
Inventories	27,970,146
Deferred charges	12,025
Total	\$181,416,300
Liabilities	
Capital Stock:	
Preferred—Authorized and issued \$60,000,000	
Less owned by the corporation	4,154,500
Common—Authorized and issued \$60,000,000	
Less owned by the corporation	2,668,000
Funded debt	19,735,000
Current liabilities	9,731,944
Reserves for accident compensation, fire insurance fund and pension system	1,297,583
Other reserves, except depreciation and depletion	6,665,998
Unappropriated surplus	30,808,275
Total	\$181,416,300

Prior to the reorganization of the Jones & Laughlin Steel Co. its first statement of earnings was made public, revealing net earnings of \$22,611,085 in 1920, followed by a precipitous decline in 1921 which showed a deficit of \$3,610,037. In 1922 net earnings rose to about \$4,900,000. The average yearly net earnings for the 10 years ended December, 1922, were \$11,050,604.

The consolidated balance sheet of Oct. 31, 1922, showed net tangible assets of \$137,200,000. Total funded debt was \$21,700,000 and current assets \$66,000,000, including \$31,400,000 in cash and Government obligations.

Birmingham to Produce Sheets

The Steel Corporation will build a sheet mill at the Fairfield works of the Tennessee Coal, Iron & Railroad Co., Birmingham. This will be the first sheet mill in the South. The steel making equipment will be increased by the addition of four open-hearth furnaces.

The United States Steel Corporation has found it necessary to curtail the allotment of stock offered to employees, owing to a large oversubscription of about 100,000 shares offered early in January. Subscriptions up to two shares will be met in 1924, but above that figure they have been cut to 50 per cent. Last year 100,730 shares of common stock were sold to employees and this year's offering was limited to that amount.

The Delaware River Bridge Commission, which has called for bids, closing March 19, on 20,000 tons of structural steel for the Philadelphia-Camden bridge, has also asked for bids on the same date on 450 tons of cable bands (steel castings).

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. 2.40c. to 2.50c.

Structural Materials

Beams, channels, etc., base, per lb. 2.40c. to 2.50c.
Sheet piling 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. 2.40c.
Soft steel bars for cold finishing \$3 per ton over base
Reinforcing steel bars, base 2.40c.
Refined iron bars, base, per lb. 3.10c. to 3.15c.
Double refined iron bars, base, per lb. 4.75c.
Stay bolt iron bars, base, per lb. 7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb. 3c.
Bands, base, per lb. 3c.
Strips, base, per lb. 3c.

Cold-Finished Steel

Bars and shafting, base, per lb. 2.90c. to 3c.
Bars, S. A. E. Series, No. 2100 4.75c.
Bars, S. A. E. Series, No. 2300 6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100 5.25c. to 5.50c.
Strips, base, per lb. 4.75c. to 5.00c.

Wire Products

(To jobbers in car lots)

Nails, base, per keg \$3.00
Galvanized nails, 1 in. and over \$2.25 over base
Galvanized nails, less than 1 in. 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. \$2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg 3.45
Cement coated nails, base, per count keg \$2.60 to 2.70
Bale ties, carloads to jobbers 75 and 2 1/2 per cent off list
Woven fence, carloads (to jobbers) 67 1/2 per cent off list
Woven fence, carloads (to retailers) 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 5 per cent off list
Machine bolts, all sizes, cut threads 60 and 5 per cent off list
Carriage bolts, 1/2 x 6 in.
Smaller and shorter, rolled threads 60 and 5 per cent off list
Carriage bolts, cut threads, all sizes 50, 10 and 5 per cent off list
Lag bolts 65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads 50 and 10 per cent off list
Other style heads 20 per cent extra
Machine bolts, c.p.c. and t. nuts, 1/2 x 4 in. 50 and 5 per cent off list
Larger and longer sizes 50 and 5 per cent off list
Hot pressed squares or hex. nuts, blank 4.25c. off list
Hot pressed nuts, tapped 4.25c. off list
C.p.c. and t. square or hex. nuts, blank 4c. off list
C.p.c. and t. square or hex. nuts, tapped 4c. off list
Semi-finished hex. nuts:
1/2 in. and smaller, U. S. S. 80 and 5 per cent off list
1/2 in. and larger, U. S. S. 75 and 5 per cent off list
Small sizes, S. A. E. 80, 10 and 5 per cent off list
S. A. E., 1/2 in. and larger 75, 10 and 5 per cent off list
Stove bolts in packages 75, 10 and 5 per cent off list
Stove bolts in bulk 75, 10, 5 and 2 1/2 per cent off list
Tire bolts 60 and 10 per cent off list
Bolt ends with hot pressed nuts 60 and 5 per cent off list
Bolt ends with cold pressed nuts 50 and 5 per cent off list
Turnbuckles, with ends, 1/2 in. and smaller, 50 to 55 and 5 per cent off list
Turnbuckles, without ends, 1/2 in. and smaller, 65 and 5 to 70 and 10 per cent off list
Washers 5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E. U. S. S.	Per 1000 S. A. E. U. S. S.
1/4-in.	\$4.80	\$4.80
1/2-in.	5.50	6.00
3/4-in.	6.50	7.00
1-in.	9.00	9.50
1 1/2-in.	11.00	11.50
1-in.	\$15.00	\$15.00
1 1/4-in.	19.50	20.00
1 1/2-in.	28.50	28.50
1 3/4-in.	37.00	37.50
2-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled hex. head cap screws 75, 10 and 5 per cent off list
Milled standard set screws, case hardened 75, 10 and 5 per cent off list
Milled headless set screws, cut thread 75, 10 and 5 per cent off list
Upset hex. head cap screws, U. S. S. thread 80, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread 80, 10 and 10 per cent off list
Milled studs 65 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. \$2.75
Small rivets 70 and 10 per cent off list

Track Equipment

Spikes, 1/2 in. and larger, base, per 100 lb. \$3.00 to \$3.15
Spikes, 1/2 in., 1/4 in. and 3/8 in., per 100 lb. 3.25 to 3.50
Spikes, 3/8 in. 3.25 to 3.50
Spikes, boat and barge, base, per 100 lb. 3.25 to 3.50
Track bolts, 3/4 in. and larger, base, per 100 lb. 4.00 to 4.25
Track bolts, 1/2 in. and 3/4 in., base, per 100 lb. 4.50 to 5.00
Tie plates, per 100 lb. 2.60
Angle bars, base, per 100 lb. 2.75

Welded Pipe

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1/4	45	19 1/2	1/4 to 3/8	+11	+39
3/4 to 1	51	25 1/2	3/8	22	2
1 1/4	56	42 1/2	1 to 1 1/2	28	11
1 3/4	60	48 1/2		30	13
2	62	50 1/2			

Lap Weld

2	55	43 1/2	2	23	7
2 1/2 to 6	59	47 1/2	2 1/2	26	11
7 and 8	56	43 1/2	3 to 6	28	13
9 and 10	54	41 1/2	7 to 12	28	11
11 and 12	53	40 1/2			

Butt Weld, extra strong, plain ends

1/4	41	24 1/2	2 to 3	61	50 1/2
3/4 to 1	47	30 1/2	3/4 to 3/8	+19	+54
1 1/4	53	42 1/2	1 1/2	21	7
1 3/4	58	47 1/2	2	28	12
2	60	49 1/2	1 to 1 1/2	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	15
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	7
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1 1/2 points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel	Charcoal Iron
2 to 2 1/4 in. 27	1 1/2 in. +18
2 1/2 to 2 3/4 in. 37	1 3/4 to 1 7/8 in. +8
3 in. 40	2 to 2 1/4 in. -2
3 1/4 to 3 3/4 in. 42 1/2	2 1/4 to 3 in. -7
4 to 13 in. 46	3 1/4 to 4 1/2 in. -9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in. 55	3 and 3 1/4 in. 36
1 1/4 and 1 1/2 in. 47	3 1/2 and 3 3/4 in. 37
1 3/4 in. 31	4 in. 41
2 and 2 1/4 in. 22	4 1/2 in. and 5 in. 33
2 1/2 and 2 3/4 in. 32	

Hot Rolled

3 and 3 1/4 in. 38	4 in. 43
3 1/2 in. and 3 3/4 in. 39	

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base \$3 per cent off list
Carbon 0.30 to 0.40, base \$1 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.	Cents per Ft.
2-in. O.D. 12 gage 15	2 1/4-in. O.D. 10 gage 20
2-in. O.D. 11 gage 16	3-in. O.D. 7 gage 35
2-in. O.D. 10 gage 17	1 1/4-in. O.D. 9 gage 15
2 1/4-in. O.D. 12 gage 17	5 1/2-in. O.D. 9 gage 55
2 1/4-in. O.D. 11 gage 18	5 1/2-in. O.D. 9 gage 57

Tin Plate

Standard cokes, per base box \$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base \$11.00	20-lb. coating I. C. \$14.90
8-lb. coating I. C. 11.30	25-lb. coating I. C. 16.20
12-lb. coating I. C. 12.70	30-lb. coating I. C. 17.35
15-lb. coating I. C. 13.95	35-lb. coating I. C. 18.35
	40-lb. coating I. C. 19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. 8.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. 5.35c.

Galvanized

No. 28 (base), per lb. 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb. 5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. 8.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports	
Old range Bessemer, 55 per cent iron.....	\$6.45
Old range non-Bessemer, 51½ per cent iron.....	5.70
Mesabi Bessemer, 55 per cent iron.....	6.20
Mesabi non-Bessemer, 51½ per cent iron.....	5.55
Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore	
Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian..	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal.....	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	42c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	\$8.25 to \$10.00
Chrome ore, basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f. Atlantic seaboard.....	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York.....	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$107.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid.....	107.50
Ferrosilicon, 50 per cent, delivered.....	75.00
Ferrosilicon, 75 per cent.....	140.00
Ferrotungsten, per lb. contained metal....	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.....	10.50c.
Ferrovandium, per lb. contained vanadium	\$3.50 to \$4.00
Ferrocobaltitium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)	
Spiegeleisen, domestic, 19 to 21 per cent.....	\$38.00 to \$40.00
Spiegeleisen, domestic, 16 to 19 per cent.....	37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, \$42.50; 11 per cent, \$45; 12 per cent, \$47.50.	
Silvery iron, 5 per cent, \$30.00; 6 per cent, \$31.00; 7 per cent, \$32.00; 8 per cent, \$33.50; 9 per cent, \$35.50; 10 per cent, \$37.50; 11 per cent, \$40.00; 12 per cent, \$42.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	\$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	23.50
Per 1000 f.o.b. works:	
Fire Clay	
Pennsylvania	High Duty \$42.00 to \$45.00 Modern Duty \$37.00 to \$42.00
Maryland	47.00 42.00
Ohio	42.00 to 43.00 37.00 to 39.00
Kentucky	42.00 to 43.00 37.00 to 39.00
Illinois	37.00 to 42.00
Missouri	42.00 to 45.00 35.00 to 40.00
Ground fire clay, per net ton.....	6.00 to 7.00
Silica Brick:	
Pennsylvania	\$40.00 to 42.00
Chicago	49.00
Birmingham	50.00
Ground silica clay, per net ton.....	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
Chrome Brick:	
Standard size, per net ton.....	47.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$40.00
Rolling billets, 2-in. and under.....	40.00
Forging billets, ordinary carbons.....	45.00
Sheet bars, Bessemer.....	42.50
Sheet bars, open-hearth.....	42.50
Slabs	40.00
Wire rods, common soft, base, No. 5 to ¾-in.....	51.00
Wire rods, common soft, coarser than ¾-in.....	\$2.50 over base
Wire rods, screw stock.....	\$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40.....	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55.....	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75.....	7.50 per ton over base
Wire rods, carbon over 0.75.....	10.00 per ton over base
Wire rods, acid.....	15.00 per ton over base
Skelp, grooved, per lb.....	2.30c.
Skelp, sheared, per lb.....	2.30c.
Skelp, universal, per ton.....	2.30c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton.....	\$43.00
Rails, light, new steel, base, lb.....	2c. to 2.15c.
Rails, light, rerolled, base, per lb.....	1.35c. to 2.00c.
Spikes, ¾-in. and larger, base, per 100 lb....	\$3.00 to \$3.15
Spikes, ½-in. and smaller, base, per 100 lb....	3.25 to 3.50
Spikes, boat and barge, base, per 100 lb.....	3.25 to 3.50
Track bolts, ¾-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.....	2.60
Angle bars, per 100 lb.....	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill.....	2.40c.
Bars, rails, steel reinforcing, base, per lb....	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago, per lb..	3c.
Ground shafting, base, per lb.....	3.40c.
Cut nails, base, per keg.....	\$8.15 to \$8.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (¾% Nickel, 10 to 20 per cent Carbon)...	\$3.50
2300 (3½% Nickel).....	\$5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200* (Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel).....	4.50 to 4.75
9250 (Silico Manganese spring steel).....	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum).....	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic.....	\$0.32	Buffalo	\$0.265	St. Louis	\$0.42	*Pacific Coast.....	\$1.15
Philadelphia, export.....	0.235	Cleveland	0.215	Kansas City	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic.....	0.31	Cleveland, Youngstown		Kansas City (pipe)...	0.705	Birmingham	0.53
Baltimore, export.....	0.225	Comb.	0.19	St. Paul	0.60	Memphis	0.56
New York, domestic.....	0.34	Detroit	0.29	Omaha	0.735	Jacksonville, all rail..	0.70
New York, export.....	0.255	Cincinnati	0.29	Omaha (pipe)	0.705	Jacksonville, rail and	
Boston, domestic.....	0.365	Indianapolis	0.31	*Denver	1.15	water	0.415
Boston, export.....	0.255	Chicago	0.34	†Denver (pipe)	1.17	New Orleans	0.67

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Structural Steel Work Shows Still Further Falling Off in Volume

Awards of structural steel for buildings, bridges, etc., totaled only slightly over 15,000 tons in the past week, while the volume of new inquiries, only 9000 tons, also shows a decline from the total of recent weeks. In the fabricating industry the lull is described as only temporary, as a good deal of work is in prospect.

Public schools Nos. 206 and 215, New York, 1250 tons each, to McClintic-Marshall Co.

Public school No. 125, New York, 1250 tons, to Harris Structural Steel Co.

Public school No. 116, Borough of Queens, New York, 1000 tons, to George A. Just Co.

New York Orthopedic Hospital, New York, 350 tons, to Taylor-Fichter Steel Corporation.

Junior and senior high school and power house, Ironwood, Mich., 467 tons, to American Bridge Co.

Crane Co., Chicago, extension to boiler house at Corwith plant, 472 tons, to American Bridge Co.

L. Ginsberg & Sons, Des Moines, Iowa, addition to store, 236 tons, to Pittsburgh-Des Moines Steel Co.

Kokomo Steel & Wire Co., galvanizing building, nail mill and warehouse, Kokomo, Ind., 246 tons, to unknown fabricator.

Waukegan Generating Co., Waukegan, Ill., power station, 263 tons, to Vierling Steel Works.

University of Illinois, Urbana, gymnasium, 727 tons, to Duffin Iron Works.

Pacific Portland Cement Co., San Francisco, trolley bridge, 346 tons, to McClintic-Marshall Co.

Southern California Edison Co., Long Beach, power house, 1600 tons, to Llewellyn Iron Works.

Davenport, Iowa, municipal power plant, 250 tons, to Rock Island Bridge Co.

Louisville & Nashville Railroad, freight station at Covington, Ky., 250 tons, general contract to George H. Rommell Co.

Standard Sanitary Mfg. Co., Louisville, factory building, 300 tons, to Sneed Architectural Iron Works Co.

Charles F. Klein, Erie, Pa., two stores, 200 tons, to Erie Steel Construction Co.

High school, Palmyra, N. Y., 100 tons, to Kellogg Structural Steel Co.

Tremont Realty Trust Co., Boston, office building and theatre, 1500 tons, to New England Structural Co.

Timken Roller Bearing Co., Canton, Ohio, blooming mill, soaking pit and roll hardening building, 700 tons, to the Canton Bridge Co.

Loft building, 247 West Thirty-seventh Street, New York, 2400 tons, to A. E. Norton, Inc.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Chesapeake & Ohio Railroad, bridge, 500 tons.

Tennessee Copper & Chemical Corporation, buildings to be erected in the Cincinnati district, 500 tons.

Atlantic Coast Line, bridge, 300 tons.

Commonwealth of Pennsylvania, storage sheds, 1000 tons; former bids rejected a few months ago.

Apartment hotel, Fifty-fourth Street and Madison Avenue, New York, 600 tons.

Public schools, Nos. 180 and 212, New York, 1000 tons each; No. 97, New York, 300 tons.

Telephone building, Westchester, N. Y., 200 tons.

Roberts Street bridge, St. Paul, Minn., 700 tons.

Youngstown Sheet & Tube Co., blast furnace, Indiana Harbor, Ind., 935 tons.

Michigan Belt Telephone Co., Grand Rapids, Mich., office building, 900 tons.

Union Rock Co., Azusa, Cal., crushing plant, 140 tons.

Columbia Mills, Minetto, N. Y., addition to roller building, 140 tons.

Cincinnati, Lebanon & Northern, freight house at Cincinnati, 250 tons, bids taken.

Brown Theater, Louisville, estimated 450 tons, bids to be asked shortly.

Junior high school, Berlin, N. H., 100 tons.

RAILROAD EQUIPMENT BUYING

Pennsylvania Railroad Distributes Orders for 12,000 All-Steel Car Bodies

The orders of the Pennsylvania Railroad for 12,000 all-steel freight car bodies constituted the principal business of the week in the railroad equipment field. Other orders for freight cars totaled 2200, the largest of which was 750 cars. There were orders for 40 locomotives. The New York Central, whose car purchases now total 15,500, has options of 3000 additional.

The Pennsylvania Railroad has let contracts for 12,000 freight car bodies as follows: Pressed Steel Car Co., 3000 box car bodies; Standard Steel Car Co., 2000 automobile car bodies; American Car & Foundry Co., 2000 box car bodies; Pullman Co., 2000 box car bodies; Bethlehem Steel Co., 1000 box car bodies; Newport News Shipbuilding & Dry Dock Co., 1000 automobile car bodies; Liberty Car & Equipment Co., 500 stock car bodies; General American Car Co., 500 stock car bodies. The order of 1000 bodies to the Newport News Shipbuilding & Dry Dock Co. was tentatively awarded several weeks ago, and announced in THE IRON AGE at that time.

The Maine Central has ordered 100 steel gondolas and 13 passenger cars from the Standard Steel Car Co. and 250 box cars from the Laconia Car Co.

The Canadian National Railways have placed an order with the American Locomotive Co. for 30 Mikado locomotives.

The Grand Trunk Railroad, Western Lines, has placed an order with the American Locomotive Co. for 10 8-wheel switching engines.

The New York Central has placed 500 box cars with the American Car & Foundry Co. in addition to the 5500 reported placed with that builder last week. Counting 500 box cars bought for its subsidiary, the Cincinnati Northern, as reported in this column two weeks ago, the New York Central has ordered a total of 15,500 cars and has options on 3000 more which, it is expected, will be exercised shortly.

The Santa Fe has placed 500 stock cars with the Standard Steel Car Co., bringing its purchases to date up to 5000, or the total number of cars covered in its inquiry.

The Delaware, Lackawanna & Western has placed 750 with the Magor Car Co.

The Universal Portland Cement Co. has placed 50 70-ton hopper cars with the Mount Vernon Car Mfg. Co.

The Nashville, Chattanooga & St. Louis has ordered 50 steel hopper ballast cars from the Tennessee Coal, Iron & Railroad Co.

The Gary Tube Co. is inquiring for 36 flat skelp cars.

The Kentucky & Indiana Terminal is inquiring for 5 locomotives.

The Detroit & Toledo Shore Line is inquiring for 3 Mikado engines.

The Union Railroad is inquiring for 2 locomotives.

President Coolidge Still Firm for the Mellon Tax Bill

WASHINGTON, March 4.—President Coolidge remains unchanged in his position with regard to tax legislation and still is strongly supporting the Mellon or Administration bill, despite passage of the Longworth bill in the House last week. This was made known today at the White House. The President is represented as being hopeful that the Senate Committee on Finance, before which the Longworth bill now is, will report a bill identical with or largely similar to the Mellon bill. The President, however, it was stated, would not attempt to say whether or not he would veto any given measure until it has reached him and he has had a chance to study it carefully.

The President is known to view the Mellon bill as one which is scientifically drawn and one that would meet requirements from the point of both revenue and relief for business and other taxpayers generally as well, promising to stimulate enterprise and industrial activity.

The German electrical industry as revealed by exhibits at the Leipzig fall fair of 1923 is described by Arthur J. Gray, American trade commissioner at Berlin, in bulletin 187 of the bureau of foreign and domestic commerce of the Department of Commerce, Washington, and the 16-page pamphlet can doubtless be obtained by applying to the electrical equipment division.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery							
	Copper, New York		Straits Tin	Lead		Zinc	
	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
Feb.							
27.....	13.37 1/2	12.87 1/2	54.75	9.37 1/2	9.37 1/2	7.15	6.80
28.....	13.37 1/2	12.87 1/2	54.87 1/2	9.50	9.50	7.15	6.80
29.....	13.62 1/2	13.12 1/2	55.50	9.50	9.50	7.15	6.80
March							
1.....	13.75	13.25	55.50	9.50	9.50	7.15	6.80
3.....	14.00	13.75	56.25	9.50	9.50	7.10	6.75
4.....	14.00	13.75	55.75	9.50	9.50	7.10	6.75

*Refinery quotation; delivered price 1/4c. higher.

New York

NEW YORK, March 4.

Moderate activity characterizes all the markets except zinc. Prospects of curtailed production have sharply advanced copper prices. The tin market continues speculative and higher. The lead scarcity has continued to advance prices and the zinc market is the only one which has declined.

Copper.—Statements, apparently backed by reasonable assurance, that leading electrolytic copper producers will or have already curtailed production, has resulted in greater demand and sharp price advances. Reported plans involve reducing output by shutting down one day per week. Since these plans became known the copper market has turned sharply upward, and both consumers and dealers have come into the market, resulting in the highest prices this year. Inquiries are liberal and buying, while not heavy, is reported fair for both domestic and export account. It appears to be the general opinion that the production, which has exceeded consumption, and which has been realized for some time, is evidently going to be seriously checked. Yesterday and today electrolytic copper was sold at 14c., delivered, as the minimum price, with some sales 1/4c. to 1/2c. higher, and with some producers asking a minimum of 14.25c., delivered. Lake copper is sympathetically higher at 14c., delivered, largely nominal.

Copper Averages.—The average price of Lake copper for the month of February, based on daily quotations in THE IRON AGE, was 13.16c., New York. The average price of electrolytic copper was 12.73c., refinery, or 12.98c., delivered.

Tin.—Largely because of the absence from New York of the prominent London operator who has been active recently in the market, a period of inactivity characterized the last week. He sailed for London March 1. The week is described by some as the quietest since he put in an appearance on this side. During the week ended with Feb. 29 about 1000 tons changed hands, with Thursday the most active day, when 400 tons changed hands. One dealer absorbed from one-fourth to one-third of the week's total referred to and consumers only about one-quarter, or the entire business being divided three-quarters among dealers or one-quarter to consumers. Only a very small business was done on the New York Metal Exchange and all in all the market was featureless. Consumers continue to keep out of the market. On Friday, Feb. 29, the London operator referred to bought 100 tons of February-March shipment from the East at 55.37 1/2c. Monthly deliveries of tin into consumption in February were 3845 tons, with 3302 tons in stock and landing on Feb. 29. The February deliveries were the largest of any month on record, the previous high having been 7169 tons in July, 1918. Imports in February were 9335 tons, bringing the total for the first two months to 15,390 tons. Arrivals thus far this month have been 900 tons, with 7055 tons reported afloat. Spot Straits tin was quoted today at 55.75c., New York, the chief business being 100 tons of futures sold on the New York Metal Exchange. London prices were about £9 per ton higher than a week ago, with spot standard quoted at £289 15s., future standard at £287 10s. and spot Straits at £290 15s.

Lead.—The market is as strong as ever. The supply is even scarcer and increased production is not forthcoming even at the higher prices. No spot lead is available and there is practically no metal for March delivery, with the April position exceedingly scarce. Not less than 9.50c. must be paid for what can be had and a buyer demanding spot metal must pay 10c., with nearby positions available at not less than 9.75c. to 10c. The leading producer advanced its contract quotations twice during the week, to 8.90c. on Feb. 29 and to 9c. on Feb. 28.

Zinc.—Domestic demand for prime Western is very light and prices are consequently lower at 6.75c., St. Louis, or 7.10c., New York, a decline of about \$1 per ton during the week. A few sales for export are reported. The zinc market is the only one which declined during the week.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by leading producers. In the outside market both shot and ingot nickel are quoted at 28c. to 32c. per lb.

Antimony.—Supplies continue scarce and prices are higher, with some dealers hanging on to stocks. Chinese metal for early delivery in wholesale lots is quoted and has sold at 11.25c. to 12c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27.50c. to 28c. per lb., duty paid, by importers who are able to obtain it from their foreign principals.

Old Metals.—The market is firm and business is active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire.....	12.00
Copper, light and bottoms.....	10.50
Heavy machine composition.....	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings..	9.25
No. 1 yellow rod brass turnings.....	7.75
Lead, heavy	8.25
Lead, tea	7.00
Zinc	5.00
Cast aluminum	18.50
Sheet aluminum	18.50

Chicago

MARCH 4.—All of the virgin metals have advanced with the exception of zinc which has declined, and most of the old metals have likewise gone up. Buying has been active in most of the metals, particularly in copper, in which both forward and spot commitments have been heavy. There is little forward buying in lead, because the present strength of that metal is regarded as largely artificial. We quote in carload lots: Lake copper, 14.25c.; tin, 57c.; lead, 10c.; spelter, 6.80c.; antimony, 13.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 10c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 7.50c.; zinc, 4.25c.; pewter, No. 1, 32c.; tin foil, 35c.; block tin, 43c.; all buying prices for less than carload lots.

The Continental Gin Co., Birmingham, Ala., manufacturer of cotton ginning machinery, has placed a contract with the H. K. Ferguson Co., Cleveland, for several plant buildings including light and heavy foundries, machine shop and pattern making and pattern storage departments. These buildings will provide a floor space of 150,000 sq. ft. and when completed the company is planning the erection of other units. These plant extensions first came up in 1921 but the company at that time postponed its building program.

Members of the Electric Hoist Manufacturers' Association report an increase of 22.8 per cent in the number of hoists and an increase of 27.2 per cent in the value of hoists ordered in January as compared with December, 1923. E. Donald Tolles, 165 Broadway, New York, is secretary-treasurer of the association.

PERSONAL

Edwin Farnham Greene, president Lockwood, Greene & Co., Boston, engineers, is on his way to Europe. He is expected home about the middle of April.

G. W. McKown, district sales manager at Milwaukee for the Corrugated Bar Co. since 1917, has been appointed manager of the Milwaukee office of the American System of Reinforcing, recently opened in the Wells Building.

A. E. Lindau, president American System of Reinforcing and the American Wire Fence Co., Chicago, was elected president of the American Concrete Institute at its twentieth annual convention at the Drake Hotel, Chicago, Feb. 25 to 28.

Ray L. Krichbaum has been appointed sales manager of the Superior Sheet Steel Co., Canton, Ohio, to fill the position left vacant by the resignation of M. C. Summers, who will go to Niles, Ohio, as president and general manager of the Thomas Steel Co.

L. A. Hull has joined the sales department of the International Oxygen Co., Newark, N. J.

John K. Light, for several years associated with Joseph N. Smith & Co., Detroit, has been appointed manager of Detroit offices for the Root Co., Bristol, Conn., manufacturer of automatic counters and stampings.

William M. Ryan, president Ryan Car Co., Chicago, since its organization in 1906, has resigned and retired from active participation in the affairs of the company. He is succeeded as president by J. M. Hopkins, also head of the Camel Co., Chicago.

R. B. Weiler, for the past 12 years factory manager for the Sharples Separator Co., West Chester, Pa., has resigned this position to take a similar one with the Denney Tag Co., that city.

Robert Coates, superintendent Sharpsville Blast Furnace, Sharpsville, Pa., with which he has been connected for the past 18 years, has resigned to take up duties as superintendent of blast furnaces and ore docks for the Toledo Iron Co., Toledo, Ohio.

Aubrey O. Greer, for many years foreman in the designing department of the St. Bernard Shops, Nashville, Tenn., has been appointed superintendent of the company's extension plant.

D. R. Fithian has severed his connection with the Sharon Steel Hoop Corporation, Sharon, Pa., to become superintendent of the Waddell Steel Co., Niles, Ohio.

Charles L. Pollock, who resigned as general sales manager of the Apollo Steel Co., Apollo, Pa., about a year ago, recently became associated in a like capacity with the Canonsburg Iron & Steel Works, Canonsburg, Pa.

Alexander Darragh, formerly with the Consolidated Steel Corporation and previously for many years with the Carnegie Steel Co., who has spent the past six months in Mexico City training the salesmen of the Consolidated Rolling Mills & Foundries Co. in American methods of steel selling, has returned to New York.

Victor Wichum, chief engineer Tagliabue Mfg. Co., Brooklyn, discussed the automatic control of pressure and temperature as applied to manufacturing processes at a meeting on Feb. 28 of the Brooklyn Engineers' Club.

Secretary of Commerce Hoover, March 4, announced the appointment of Horace W. Gillett, of Detroit, former chief alloy chemist of the Bureau of Mines, as chief of the Metallurgical Division of the Bureau of Standards to fill the vacancy recently created by the elevation of Dr. G. K. Burgess to the position of director of the bureau. The announcement was forecast in THE IRON AGE of Feb. 21, page 618.

G. P. Rogers has resigned as general sales and advertising manager for the Pyrene Mfg. Co., Newark, N. J., and will become vice-president and director of sales and advertising for the Kant Rust Products Corporation, Rahway, N. J.

G. J. Hawkey of the Cleveland Duplex Machinery Co. is now representing the Reed-Prentice Co., Worcester, Mass., in the Cleveland territory for all types of standard and special machinery pertaining to the automotive industry.

Joseph Malborn has been appointed superintendent of the plant at Youngstown, Ohio, of the Sharon Steel Hoop Co., Sharon, Pa. He succeeds D. R. Fithian, who resigned to become operating head of the Waddell Steel Co., Niles, Ohio.

J. Clyde Campbell, formerly employment manager of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has been appointed management representative, with general supervision over the employment bureau, industrial relations, labor camps and the like. This department was formerly in charge of Roy M. Welch, who is now secretary to the president. Carl M. Ott, formerly connected with the employment department, has been named employment agent, succeeding Mr. Campbell.

President Eugene G. Grace of the Bethlehem Steel Co. is spending the month of March in the South.

Walter E. Watson, general sales manager Youngstown Sheet & Tube Co., Youngstown, Ohio, has gone to the Pacific Coast for a two months' combined business and pleasure trip.

R. J. Kaylor, publicity manager of the Youngstown Sheet & Tube Co., Youngstown, Ohio, recently gave an illustrated address on iron and steel making before a joint meeting of civic clubs of Newburgh, N. Y.

Horace B. Spackman, vice-president Lukens Steel Co., Coatesville, Pa., is spending a few weeks at Palm Beach, Fla.

Italian Student-Engineers Placed in American Plants

Nine young Italian engineers, recent graduates of Italian technical schools, who are being sent to the United States for work in American industries, to obtain a broad knowledge of industrial methods and processes in the United States, were welcomed Wednesday, Feb. 27, at the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York. On Monday, March 3, a second group of 19 was welcomed. Further arrivals during the next few weeks or months are expected to bring the total to 50 or more.

Both groups were welcomed by John W. Lieb, vice-president New York Edison Co., New York, who, speaking in Italian, outlined briefly the position occupied by engineering in American economic life, pointing out some of the difficulties of language and associations the students would probably encounter. Response for the students was made by P. Rossi, Italian vice-consul. When the first group was welcomed brief addresses were made by P. Torchio, chief engineer New York Edison Co.; Alberto Giannini, president of the Italian Chamber of Commerce, New York, and former High Commissioner F. Quattrone.

At the Italian consulate the students received from Consul T. F. Bernardi sealed envelopes containing instructions to report to various plants for employment. A total of 11 were sent to the plant of the Ford Motor Co., Detroit; seven to the plant of the Westinghouse Electric & Mfg. Co., East Pittsburgh; four to the Foundation Co., 120 Broadway, New York; two to the Sinclair Oil Co., Philadelphia, and one each to the Turner Construction Co., Thompson-Starrett Co., and Warren & Wetmore, all of New York, and to an automotive plant at White Plains, N. Y.

OBITUARY

HORACE A. FULLER, vice-chairman of directors of the Bourne-Fuller Co., Cleveland, died Feb. 28 in Pasadena, Cal., where he had made his home much of the time during the last few years. He was born in Cleveland 60 years ago and was long identified with the iron and steel industry in that city. His father, S. A. Fuller, was president of the Union Rolling Mill Co., Cleveland, for a number of years and some time after his death Horace A. Fuller became president of that company which was later absorbed by the Bourne-Fuller Co. When the Bourne-Fuller interests purchased the Upson Nut Co., Mr. Fuller became president of that company and remained at its head until its consolidation with the Bourne-Fuller Co. in 1918. Since then he had been devoting little attention to business. His health had not been good, but death came no less unexpectedly as the result of heart trouble. He is survived by his widow, two daughters and one brother, Willard Fuller, who was for a long time blast furnace superintendent at the Upson plant and later manager of the works until he retired last August. Mr. Fuller was a member of the American Iron and Steel Institute and of the Union, Mayfield and Country clubs in Cleveland. He was greatly beloved by all his associates. His funeral was held at Pasadena, March 4, and his body was temporarily interred in that city.



HORACE A. FULLER

DR. A. C. LOWREY, president Marting Iron & Steel Co., Ironton, Ohio, died in that city March 1, after a long illness. He was born in Lawrence County, Ohio, 54 years ago and was graduated in medicine from the Eclectic College, Cincinnati. After practicing in Lawrence County for several years he moved to Ironton, where he continued to practice with much success. Twenty years ago he married Nellie Marting, daughter of the late Col. H. A. Marting, who survives. Dr. Lowrey took an active part in political life, serving two years in the State Legislature. He was financially interested in practically all of the industries of Ironton and upon the reorganization of the Marting Iron & Steel Co. in 1921 was elected president, which position he filled until his death.

CHARLES A. COLLINS, manager Federal Foundry Supply Co., Milwaukee, died at West Suburban Hospital, Oak Park, Ill., on Feb. 26, after a brief illness. He was 34 years of age and was born in Cleveland, where the funeral took place on March 1.

JOHN GIVAN DAVIS MACK, State chief engineer of Wisconsin, died suddenly of heart disease at his home in Madison on Feb. 24, aged 56 years. He was a graduate of Rose Polytechnic Institute and of Cornell University. Mr. Mack was appointed instructor of machine design, University of Wisconsin college of engineering in 1893 and was made a full professor in 1903. From 1905 to 1912, he served as chief of the mechanical department, Railroad Commission of Wisconsin. In 1915 he was appointed head of a new state department of engineering. Mr. Mack was a member of the American Society of Mechanical Engineers and was president of the Engineering Society of Wisconsin in 1913-1914.

LINCOLN A. TREAT, chief engineer at the Lowellville, Ohio, plant of the Sharon Steel Hoop Co., died at his home in Poland, Ohio, Feb. 25. He had been a resident of Youngstown and vicinity for the past 31 years and had been identified with the expansion of the iron and

steel industry of the Mahoning Valley which marked that period. He was born in Western New York in 1863 but was raised in Illinois where his parents located in 1867. He received his education in the public schools of Joliet, Ill. Before becoming associated with the Sharon Steel Hoop Co., he had been engaged in engineering capacities with the Illinois Steel Co. at its North works; the Carnegie Steel Co. at its Duquesne and Ohio works, and the Youngstown Engineering Co., Youngstown.

W. S. RULISON, iron and steel broker, Cincinnati, died at his home in that city, Feb. 27. He was for many years connected with the W. F. Robertson Steel & Iron Co. and resigned a year ago to enter business for himself. He was 62 years of age.

GRAHAM MCFARLANE, pioneer iron manufacturer at Clarksville, Tenn., died Feb. 27 at Asheville, N. C. He purchased the Red River furnace property at Clarksville 20 years ago from the Louisville & Nashville Railroad, and operated it until 18 months ago, when it was sold to J. J. Gray, Jr., of Rockdale, Tenn. Mr. McFarlane was also interested in various furnace properties at Bear Springs and Carlisle, Tenn.

HENRY P. WESTCOTT, aged 46 years, president and owner of the Westcott Valve Co. at Seneca Falls, N. Y., and Erie, Pa., died unexpectedly at his home in Erie Feb. 27, following a three days' illness of pneumonia. He was formerly vice-president and treasurer of the Westcott Rule Co., but resigned that position two years ago to complete the organization of the Westcott Valve Co.

GEORGE F. KONOLD, president Warren Tool & Forge Co., Warren, Ohio, died in that city March 3, from complications following an operation. He was born 59 years ago and had been superintendent of the Iron City Tool Works of Pittsburgh for 23 years.

Waddell Steel Co. Organized

The Waddell Steel Co., operating a sheet mill property at Niles, Ohio, has been organized by election of the following directors: Jacob D. Waddell, R. L. McCorkle, A. J. Bentley, W. H. Davey and D. C. DeFord. Mr. Waddell was elected president and treasurer, Mr. McCorkle, vice-president, and M. A. Jones, secretary. The latter was formerly secretary of the Mahoning Valley Steel Co., Niles, and associated with Mr. Waddell in its management.

Mr. Davey is president of the Mansfield Sheet & Tin Plate Co. of Mansfield, Ohio, while Mr. Bentley is president of the Ohio Galvanizing Co. of Niles.

The company has purchased the Empire plant at Niles, consisting of seven sheet mills, from the Youngstown Sheet & Tube Co., Youngstown, and expects to begin initial operations about March 10, when four mills will get under power.

The company is capitalized at \$600,000, equally divided between common and preferred. Of the preferred \$125,000 will be offered for sale and \$250,000 of the common.

Dismantling Zanesville Furnace

Zanesville furnace of the Carnegie Steel Co., Zanesville, Ohio, is being dismantled and its passing reduces the total number of blast furnaces of that company to 58. This furnace was a very small one with an annual rate of capacity of 50,000 tons of pig iron and has not been operated since late in 1918 when the war demand for iron and steel was at its height and every blast furnace of the Carnegie Steel Co. was in production. Zanesville furnace was built in 1870 and was rebuilt in 1883. It was last relined in 1909.

The New England Iron League will hold its annual meeting and dinner on Tuesday evening, March 11, at the Exchange Club, Boston.

MATTHEW ADDY CO. WINS

Decision of Supreme Court Vindicates Cincinnati Defendant in War-Time Case

Complete vindication came last week to the officials of the Matthew Addy Co., Cincinnati, of the charge of profiteering in coal during the World War when the Supreme Court of the United States reversed the decisions of the lower courts and ordered the cases to be remanded to the United States Court of the Southern Ohio District with instructions to give decisions in favor of the company.

The decision was handed down by Justice James C. McReynolds, and there was no dissenting opinion. Two cases, one against the Matthew Addy Co., the other against Benjamin N. Ford, vice-president of the company, in each of which the same question was involved, went to the Supreme Court on writs of certiorari from the United States Circuit Court of Appeals for the Sixth District.

The original actions were brought by the United States Government in the United States Court of the Southern Ohio District at Cincinnati. The Matthew Addy Co. and its vice-president, Mr. Ford, were accused with having charged for coal shipments in excess of the price that had been fixed by the United States Government during the war period.

President Green's Statement

James Albert Green, president Matthew Addy Co., when informed in Cincinnati of the victory of his company, said:

"We carried the case up to the Supreme Court and spent a great deal of money, because our good name was in question, and we had a perfectly clear conscience in the whole matter. We knew that we had never violated any law, knowingly or unknowingly. Then we felt a sense of outrage that we should be haled into court on a profiteering charge, for the whole amount involved was only \$62 and some odd cents. But whether the amount was large or small it was the principle of the thing, and we went to the Supreme Court and have been vindicated."

Wages of Puddlers and Finishers Unchanged

Both puddlers' and iron finishers' tonnage rates will continue unchanged for the March-April period, as a result of the bimonthly examination of sales sheets, conducted Feb. 28 at Youngstown between representatives of the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. Examination of sales sheets disclosed an average price of 2.35c. per lb. on bar iron shipped during the 60-day period ending Feb. 20, unchanged from the average two months previously. The puddling rate of \$13.13, effective the past two months, therefore continues without change.

Satisfactory Conditions in Youngstown

YOUNGSTOWN, March 4.—While evidences of conservatism in forward buying are noted by district interests, nevertheless Valley independents have built up comfortable backlogs in the past two months and are inclined to view the immediate future placidly. Reports of price concessions appearing in competitive territory are not borne out here, is insisted by sales managers, who declare current levels are being well maintained.

There has been no large influx of business since announcement of the maintenance of existing price levels through the second quarter. Consumers apparently are disposed to hold down their commitments to some extent, since there appears to be no indication of an advance.

Valley sheet makers are all operating at a high rate, but in some cases new orders for common sheets last month fell below shipments, indicating that producers will need more business if they are to continue existing schedules. The market on full finished grades is

well sustained and there is considerable automobile buying.

Proposed Adjustment of Rates on Iron and Steel Not Justified

WASHINGTON, March 4.—In a tentative report made public yesterday, Examiner Charles R. Seal of the Interstate Commerce Commission held as not justified proposals of the railroads to adjust rates on iron and steel products between points in the Pittsburgh district and adjacent territory in Pennsylvania, New York, Ohio, West Virginia and Maryland. He recommended that the commission order the railroads to cancel the suspended schedules providing for the adjustment which would call for both increases and decreases in rates. The schedules were intended to remove so-called short-haul violations found in connection with the cases of the American Shipbuilding Co. and the Parkersburg Rig & Reel Co. In the former case, the commission found not unreasonable the fifth class rates on iron and steel products from the Pittsburgh district to Cleveland, Lorain, Canton and Akron, Ohio, although they exceeded the aggregate of intermediate commodity rates to and from Youngstown. The commission directed the removal of the fourth section or short haul violation. The Parkersburg case was of similar nature as to short haul violations, but affecting rates from Pittsburgh to Wheeling, W. Va. Shippers protested strongly against the decision in the Shipbuilding case.

In passing upon the proposed schedules of the railroads, Examiner Seal said that the railroads had made no attempt to justify the proposed increased rates upon the ground that the earnings under the present rates are inadequate, or that the traffic does not bear its fair share of the transportation costs. On the other hand, he said, not only do the present rates on the whole compare favorably with commodity rates maintained in various other sections where the volume of tonnage is much smaller, "but the earnings thereunder appear to be ample when consideration is given to the enormous volume of tonnage and the consequent regularity of movements, the heavy car loading, the character of the commodities as low grade traffic, and other elements."

Valley Operations in Excess of 90 Per Cent

YOUNGSTOWN, March 4.—Valley iron and steel properties are being operated at a continued high rate, in excess of 90 per cent. Suspensions are occurring in a number of departments due to the necessity of repairs. Six tin mills have been suspended by the Trumbull Steel Co. because of congestion in the tin house. The tin pots at the Liberty plant, which have been idle for a year, resumed this week.

The Youngstown Sheet & Tube Co. has suspended its 9-in. bar mill, while repairs are being made to its furnace. The A. M. Byers Co. is repairing one of the skelp mills this week at its Girard plant.

Average of independent steel ingot capacity in action is well above 90 per cent. Percentage of operations by Valley independents is: Youngstown Sheet & Tube Co., 95 per cent; Republic Iron & Steel Co., 90 per cent; Sharon Steel Hoop Co., 95 per cent; Trumbull Steel Co., 97 per cent; A. M. Byers Co., 90 per cent at its Girard works.

Non-integrated rolling interests, such as the Newton Steel Co., Falcon Steel Co. and Mahoning Valley Steel Co. are running close to 100 per cent.

Large Order for Power Plant Equipment

CINCINNATI, March 4.—The Union Gas & Electric Co., Cincinnati, has placed orders with Babcock & Wilcox, Ltd., Federal Electric Co., Fuller Engineering Co., and Worthington Pump & Machinery Corporation for equipment for its new power plant near Cincinnati. It also placed an order for one locomotive with Baldwin Locomotive Works. The value of equipment purchased is approximately \$5,000,000.

Metalloids in Basic Pig Iron

(Continued from page 718)

actual operation. These typical heats, on a cost basis, showed the following results:

Scrap	\$29.11
Standard iron.....	30.70
Standard iron, low-silica ore.....	30.27
High-manganese iron.....	30.27
High-manganese iron, low-silica ore.....	29.77
Excess limestone.....	31.57
High-silicon iron.....	32.21
High-phosphorus iron.....	31.12

While the scrap heat does not represent regular practice in the South Chicago district, it is included to show what economies might be realized by this simple melting process, when the relative cost of heavy melting scrap and iron permit. The heats with the low-silica ore have been included to show the savings possible from this source. The excess limestone heat was included to show that this customary method of reducing sulphur is expensive.

As already mentioned, the open-hearth reactions are highly oxidizing, and the oxidizing capacity of the furnace when high percentages of iron are charged must be enhanced by the introduction of an amount of oxygen in the form of iron ore. The demand for ore will depend on the type and age of the furnace and the weight of metalloids charged.

While the exact constitution of a basic open-hearth slag is not thoroughly understood and analyses vary over wide limits, a good slag will always possess certain outstanding characteristics. Such a slag may be considered to consist of a phosphate and a silicate portion, the former being held in solution by the silicate slag. Moreover the basic and acid constituents must be so proportioned as to permit the slag to hold the impurities, and also to be of the proper consistency at the temperature of the furnace. This physical property might be termed fluidity.

So with a set of factors for determining the amount of ore and lime and the quantity of slag that the charge would yield, the chemical balance sheets for the eight heats were worked out, as well as the thermal balance sheets. [The paper contains detailed tables giving the thermal balance sheets and other data, such as combined practice and cost sheets.]

Slag as a Vital Factor

One of the most vital factors in the economical operation of a basic open-hearth furnace is the slag; and on account of improper composition and excessive volumes, the process as a whole suffers grave losses. While such losses cannot be entirely eliminated, because of lack of ability to forecast accurately the variation in the quantities of acids to be charged, the tendency at all times is to charge an excess of earthy bases to care for the occasional peak of acids. The determination of the quantities of earthy bases to be charged for any given amounts of silica and phosphorus may most conveniently be ascertained by taking an average composition of those slags that, under given conditions, have yielded economical operation, and empirically separating it into a silicate slag (which is assumed to hold the phosphate slag in solution) and a phosphate slag, in which the phosphorus is assumed to be combined with calcium oxide in the form of $\text{Ca}_3\text{P}_2\text{O}_8$. When this has been done, the analysis of the silicate slag is calculated, and from this the relation of the silica to the lime plus magnesia and to the weight of the silicate slag is determined. The total weight of slag, of course, is the weight of the silicate slag plus the phosphate slag, the last named being the weight of the phosphorus oxidized multiplied by 5.9.

In our operation the average composition of generally satisfactory slags shows a silicate portion which analyzes as follows: SiO_2 , 19 per cent; $\text{FeO} + \text{MnO}$, 27 per cent; $\text{Al}_2\text{O}_3 + \text{TiO}_2 + \text{S}$, 2 per cent or a total of 48 per cent. Therefore, the $\text{CaO} + \text{MgO}$ necessary to equal 100 per cent is, by difference, 52 per cent, and the $\text{CaO} + \text{MgO}$ required per unit of SiO_2 is the ratio of 52 to 19 or 2.74; and the weight of silicate slag produced per unit of silica is the ratio of 100 to 19 or 5.26. These ratios are used in all the theoretical heats

shown, except in the excessive limestone charge, where they become silicate slag to silica 7.1, and $\text{MgO} + \text{CaO}$ to SiO_2 4.01. In all cases the ratio of phosphorus to calcium oxide is 1 to 3.61, which corresponds to the composition of the tetrabasic phosphate.

Residual Manganese and Its Importance

Constructing a slag in this manner gives only the combined percentages of ferrous oxide and manganous oxide, so that it is necessary to compute on the basis of working conditions the quantity of residual manganese carried by the bath for different conditions of slag volume. With this amount ascertained, the manganese in the slag is the total manganese charged less that in the bath less that carried away by the furnace gases. The difference between the manganese in the slag, expressed as manganous oxide, and 27 per cent is the ferrous oxide in the silicate slag.

The method of calculating the residual manganese is as follows: The residual manganese remaining in a bath, after the reactions have come to a condition of equilibrium, is a function of the manganese available (i. e., the manganese charged less that which has been oxidized and carried away with the waste gases) the character of the slag, and the relative volumes or masses of slag and bath. The character of the slag determines the chemical affinity for manganese and represents the amount in the slag, other things being equal. But superimposed upon this is the relative masses of slag and bath, for a large slag volume will leave lower manganese residuals than one of similar analysis but smaller volume. For slags of similar analysis, it is considered that the manganese available will divide according to the relative masses.

$$\text{Let } \frac{\text{Weight manganese in bath}}{\text{Weight manganese in slag}} = x \text{ and } \frac{\text{Weight of bath}}{\text{Weight of slag}} = s$$

So it becomes necessary to determine the relation between x and s which is a measure of the chemical affinity and will remain essentially constant for a given type of slag. It was found, from practice, that when working with slags of this type that $s = 22.5x$.

$$\text{Let } a = \text{weight of manganese in bath;} \\ b = \text{weight of manganese in slag;}$$

$$\frac{a}{b} = x$$

$$a + b = y = \text{total weight of manganese available.}$$

$$b = y - bx \quad b = \frac{4y}{1+x}$$

$$a = y - \frac{y}{1+x} \quad a = \frac{xy}{1+x}$$

In all cases the ratio of bath to slag is known, so that it becomes possible to figure all the residuals on the same basis.

The effect of the various percentages of residual manganese on the finishing additions of manganese made in the ladle is shown in the table. The calculated amounts of pure manganese correspond to results obtained in actual practice.

Table of the Effect of Residual Manganese on Manganese Added in Ladle

	Residual Manganese, Per Cent	Weight Ingots Tons	Theoretical Manganese in Bath, quired nese, Lb.				Actual Manganese in Ladle, Pounds		Lb. 80 Per Cent FeMn
			Lb.	Lb.	Lb.	Lb.	Ton Heat		
Scrap	0.24	40.90	232	386	154	7.8	319	399	
Standard iron, high SiO_2	0.20	42.36	198	396	198	10.0	424	530	
Standard iron, low SiO_2	0.23	42.57	230	398	168	8.5	362	453	
High-manganese iron, high SiO_2	0.34	42.44	338	397	59	2.9	128	154	
High-manganese iron, low SiO_2	0.40	42.70	399	399	0	1.0	48	54	
Excess limestone.....	0.16	41.97	157	393	236	12.0	504	630	
High-silicon iron.....	0.12	42.04	118	394	276	14.0	589	736	
High-phosphorus iron	0.16	42.53	159	398	239	12.0	510	638	

It is to be emphasized that a residual manganese in excess of 0.25 per cent not only reduces the open-hearth cost per ton of ingots by decreasing the quantity of expensive ferromanganese that must be added to the heat to attain a given manganese percentage, but because of the protection it gives against overoxidation in the furnace, the quality of the steel is improved.

This higher quality steel increases the percentage of merchantable product at the mills by from 1 to 3 per cent, depending on the amount that the residual manganese exceeds 0.25 per cent; and while such a saving cannot be properly shown on the open-hearth cost sheet, it increases the net profits of the works as a unit.

The protection afforded against overoxidation by a proper percentage of residual manganese may be accounted for by the following reasoning: The oxygen of the ore first attacks the manganese, phosphorus and silicon and at the higher temperatures the carbon oxidation takes precedence. As the carbon content of the bath decreases, iron oxidation sets in; and at the lower carbon percentages the protective power of carbon oxidation is very low. It seems apparent, therefore, that in the lower carbon ranges the 0.25 to 0.40 per cent manganese, which at all temperatures is more easily oxidized than iron, can act only to prevent overoxidation of the steel.

The weight of iron oxidized and carried away in the

waste gases was taken in all ore heats to be 100 lb. per heat and the quantity of manganese lost in a similar way to be about 200 lb. per heat, in the cases of the high-manganese iron, and about 100 lb. per heat in the others. In the scrap heat, these losses were taken at 150 lb. per heat for both iron and manganese.

As a matter of precaution the percentage of phosphorus remaining in the steel, in the case of the high-phosphorus iron heat, was placed at 0.03 per cent instead of 0.01 per cent. The sulphur content of all the slags was put at 0.25 per cent, which is both conservative and common in practice. All the calcium, magnesium and aluminum oxides carried in with the charge appear in the slag.

[The paper concludes with a discussion of the elimination of sulphur. The author shows that the usual practice of removing an excessive proportion of this element by the addition of a large surplus of limestone may actually be more expensive than the use of manganese for this purpose.]

CASTING NON-FERROUS METALS

Composition and Temperatures Affecting Phosphor Bronze, Admiralty Metal and Other Alloys

A lecture of interest to foundrymen was delivered on Saturday, Jan. 12, at the Institute of British Foundrymen in Manchester, England, by Dr. Barclay. The subject was "The Practical Value of Non-ferrous Metals." Phosphor bronze, British admiralty gunmetal, naval brass and copper were in turn discussed. The lecturer emphasized the need for an understanding between engineer and foundryman. It was impossible, he said, for the foundryman to produce satisfactory castings unless he knew the purpose for which they were intended.

Phosphor Bronze

Phosphor bronze was not a homogeneous metal and its composition should depend upon whether it was to be used as a bearing metal or for a purpose where it would have to resist corrosive action. It must be quite free from impurities to resist corrosion. There might be a content of 4 per cent zinc but, as the zinc segregated, the percentage in some parts of the casting would be much higher than this. Phosphor bronze was good for turbo pump impellers because of its non-corrosive qualities. A trace of iron was not harmful but the less lead in the bronze when used for this purpose the better. The hammering action, or cavitation, had also to be considered. When used as a bearing metal, ductility was necessary and up to 1 or 1.25 per cent of phosphor and 6 to 8 per cent of lead made a good bearing metal. In sea or mine water phosphor bronze had twice the life of mild steel.

Admiralty Metal

With regard to the well known admiralty gunmetal mixture, 88-10-2, the reason for the insistence that lead must be kept down to under one-half of 1 per cent was because of the high temperatures to which it was subjected. Lead lost its strength above 500 deg. Fahr. For most purposes the inclusion of lead in gunmetal up to 1 per cent was beneficial and not harmful if it did not exceed 1.50 per cent. For naval brass castings which had to be cold worked, or with sand castings subjected to hydraulic pressure, the copper content should be above 60 per cent. More than 1 per cent of tin was not soluble in the mixture and the inclusion of 1.50 per cent of lead improved the metal's machineability. Engineers did not appreciate the effect of superheating temperatures, the maximum stress falling with increase of temperature. Phosphor bronze, in this respect, was much superior to other metals such as manganese brass, and Monel metal was

very good. A good aluminum alloy had almost three times the heat conductivity of cast iron.

The best casting temperature for phosphor bronze, in Dr. Barclay's opinion, is 1100 deg. C., but bearing metal is best cast at just over 1000 deg. C. Gunmetal, he thought, while no definite figure was possible, was best when cast about 1200 deg. C. When cast too hot it was sure to be porous and when cold, weak but not necessarily bad.

Discussion

J. Glen Primrose said there was a big difference between high and low phosphor bronze. With regard to admiralty gunmetal he had had 15 years' experience with this and did not know all about it yet. Too much tin in the mixture caused "weeping" and segregation in heavy sections. Tin should be cut down to 9.5 per cent. A "weeping" casting could be remedied by annealing to about 700 deg. C. Annealing increased the tensile strength slightly and enormously increased the elongation. It was possible to obtain good results with scrap if it did not contain too much lead, which came out in the casting as absolutely pure metal.

In reply to a question relative to electrical castings, the lecturer said the electrical designer and the foundryman should get together to obtain castings of high conductivity. Many electrical castings were of too heavy design and, to obviate this, certain American companies made motor slip rings in two parts, an inner part shrunk on the shaft and an outer ring.

Another speaker commented on the fact that for propeller bosses for ships, engineers had come back to steel castings which lasted as long in salt water as many parts of the engine, and Dr. Barclay admitted that, for propeller bosses, steel was an economy. Another question elicited the reply that pyrometric control was not possible in the foundry. Pyrometers were valueless, said the lecturer, unless there was some means of frequently calibrating them. The experienced melter could tell when the metal was ready for pouring. With steel also the eye was better than any pyrometer.

January Refractories Statistics

Figures for January show a considerable drop from December in both clay and silica brick. The shipments of clay fire brick in January amounted to 37,420,170 or 68 per cent of capacity reporting, and new orders were 46,118,987 or 84 per cent of capacity. In silica brick, shipments are given as 5,501,185 or 56 per cent of capacity reporting, and new orders as 9,375,729 or 96 per cent of capacity. Net new business in silica brick showed a marked increase over December, amounting to 8,868,390 brick against 3,361,241 brick—a gain of more than 160 per cent.

SOUTHERN METAL TRADES

Association's Annual Convention Listens to Several Foundry Addresses

Several subjects of interest to foundrymen in particular were discussed at the seventh annual convention of the Southern Metal Trades Association at New Orleans, Feb. 26 and 27. A fairly ambitious program was carried out.

At the first session, after the usual preliminary addresses of welcome, and the transaction of business, Enrique Touceda, consulting engineer, Albany, N. Y., delivered an address entitled "Miscellaneous Details in Connection with Gray Iron Foundry Practice." The address was delivered with lantern slides illustrating the relationship between the so-called crystalline structure of rocks and that of metals, discussing at the same time the underlying principles of the solidification of metals, their melting or cooling range and other fundamental principles. These facts were discussed in both an entertaining and illuminating manner and also so simply that the subject was made surprisingly clear. In concluding his address Prof. Touceda said:

While general molding principles and facts concerning the action of the molten metal in the mold can be taught, such, for instance, as the particular laws applicable to liquids, for notwithstanding the fact that molten iron is over seven times as heavy as water, its action in the mold is similar to that of water both prior to and after solidification, if, when the mold is filled the water is frozen, this particular knowledge, while of value to the molder for a better understanding of his problem, is helpful in one direction only. The two laws concerning liquids with which the molders should be familiar are, that liquids seek a uniform level and that pressure is exerted equally in every direction at right angles to the surface. Some simple bromides can be imparted regarding gating, venting, ramming, heading, churning, etc., but, after all is said and done, each different pattern is a law unto itself and the molder who has to contend with poor pattern equipment and a pattern designed by an engineer who never perhaps saw a foundry in a really intimate manner has no mean job on his hands.

To fully appreciate his position as well as to become better acquainted with some of the reasons why foundry losses are high, take a pattern that is improperly supported, with the result that it will spring and give, and make note of the condition of the mold when the pattern is drawn. Put up a floor with this particular pattern in a flask that lacks rigidity and endeavor to remain a Christian.

American and European Foundries

At the session Wednesday morning, Feb. 27, Henry M. Lane, consulting engineer, Detroit, delivered an address entitled, "A Comparison of American and European Foundry Practice." This was illustrated by lantern slides and motion picture films, the speaker emphasizing that a comparison could only be made between the two countries by considering the social conditions of the two countries and their respective economic conditions. A liberal abstract of Mr. Lane's address will be published in *THE IRON AGE* of March 13.

At the same session Thomas Perkins, cost accountant of the J. S. Schofield Co. of Macon, Ga., discussed "Foundry Costs." He recounted in detail the method which his firm uses in order to arrive at costs and showed how such a method could be applied in any similar case.

Another address at the same session was by W. C. Trout, Lufkin, Tex., who took as his subject "Problems of Management in a Jobbing and Manufacturing Plant." The speaker gave an instructive talk, setting forth his own experience in managing his own plant.

Tinkering With the Transportation Act

An interesting contribution to the program was an address at the first session by E. S. Jouett, vice-president and counsel of the Louisville & Nashville Railroad. Taking as his subject "Tinkering With the Transportation Act," Mr. Jouett called attention to the fact that

the situation which was facing the country at Washington was one in which a group of radicals, parading as Republicans, was in reality splitting the old parties and hoping to put over considerable radical legislation. Their prime object was to so manipulate affairs as to reduce the revenue of the railroads to such an extent as to force Government ownership of the railroads. He called attention to the fact that if the railroads were wrecked they would carry the majority of other industries with them. In his opinion the radicals were trying to greatly increase the power of the Interstate Commerce Commission, which they hope to dominate.

In ordinary business, said Mr. Jouett, prices would be adjusted to suit the times so that in good times a surplus may be earned and carried over against lean times, but that the returns the railroads could earn were now regulated and fixed by law. "While the railroads are supposed to make 5% per cent profit, they had in reality never been able to reach this. The radicals have been attempting to cripple the roads by reducing the valuation of the roads, which would also reduce the amount that they are allowed to make and so still further hamper them. Under Government ownership the roads would no longer be subject to State and other local taxes, and hence all these taxes would have to be made up by increased personal taxes. In other words, the railroads must be allowed to make a living if a large portion of the manufacturing industries of the country be not wrecked and much private capital endangered."

Port of New Orleans

At the informal banquet Tuesday evening, at which G. W. Meador, ex-president of the association, acted as toastmaster, N. M. Leach, president Pacific-Caribbean Gulf Line, Inc., delivered an exceedingly interesting address on "The Port of New Orleans." He said this port has something over five miles of docks and wharves equipped with modern dock-handling appliances. Theoretically, something over 300 seagoing vessels could tie up at these docks at one time. In addition to the main line of docks in the river there has been established a ship canal connecting with Lake Pontchartrain and this has opened up a large new industrial region where a number of large new plants are now being directed. The speaker gave some surprising facts in regard to the tonnage of the port and the service which it is now rendering.

In his annual address the president of the association, J. R. Hedges, Chattanooga, Tenn., called attention to the fact that the association had adopted a graduated scale of dues so as to render the burden of membership lighter on the smaller foundries. He also stated that the association had done much to prevent the enactment of laws imposing unjust taxes on industry and to assist in business legislation in general.

Before the session Wednesday morning, a large number of the members and guests visited the new steel foundry operated by Dibert-Bancroft & Ross. The company also operates an extensive gray iron foundry, the steel foundry possessing electric furnace melting equipment.

Mr. Schwab Returns

Charles M. Schwab, chairman Bethlehem Steel Corporation, upon his return last week from a seven-weeks' trip through Germany, Austria and France, declared that Germany can and will pay reparations demands and "the Germans are waiting to learn what amount of reparations they will have to pay." The trip was taken purely for observation and pleasure. "It will take from five to seven years," Mr. Schwab said, "for Europe to get back to her pre-war steel production. The United States can compete in neutral markets with Europe in selling steel, but cannot where countries have a high protective tariff, as in France.

"Production costs of steel," he stated, "will increase in Europe as stabilization is reached regarding wages compared to present production costs. It will be a long time before production costs are anything like pre-war."

INSTITUTE OF METALS

Annual February Sessions Discuss Brass and Other Alloy Problems

Two sessions were held last week by the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, exclusive of the annual lecture delivered by Dr. Jeffries. The program of one session was made up of five papers covering various problems in non-ferrous alloys. It was presided over by William B. Price, Scovill Mfg. Co., Waterbury, Conn. Two papers on brass were entitled "Relation of Heat Treatment to the Microstructure of 60-40 Brass," by Robert S. Williams and Victor O. Homerberg, Massachusetts Institute of Technology, Cambridge, Mass., and the other, "Relation of Heat Treatment, Mechanical Properties and Microstructure of 60-40 Brass," by Victor O. Homerberg and Dexter N. Shaw, the latter of the research laboratory, Goodyear Tire & Rubber Co., Akron, Ohio.

The subject, "Some Low Copper-Nickel Silvers," by William B. Price, chief chemist and metallurgist, Scovill Mfg. Co., embraced an investigation of Léon Guillet concerning some of the effects of nickel on the structural properties of brass. The best value for the coefficient of equivalence, that is, the amount of zinc replaced by 1 per cent of nickel, is shown to be 1.1 per cent. The best hot and cold-working nickel silvers, varying in nickel content between the limits of 4 and 18 per cent, are tabulated and plotted diagrammatically. Also, some data are given showing a comparison between the physical properties of a hot and cold-working low copper-nickel silver, and a commercial cold-working nickel silver containing approximately 8 per cent more copper.

Brass Corrosion and Grain Size

"The Corrosion of Brass as Affected by Grain Size" was discussed in a paper by Robert J. Anderson, metallurgist Bureau of Mines, Pittsburgh, and George M. Enos, metallurgical engineer, Cincinnati. This paper describes a series of tests carried out on the corrosion of tin brass, 70:29:1 copper-zinc-tin, of different grain sizes. The accelerated electrolytic corrosion test developed by the writers in the Bureau of Mines was the method employed and several electrolytes were used as the corroding media. Contradictory opinions have been expressed as to the effect of grain size on corrosion, but the experimental data reported here show that, for the brass tested and the corrosive solutions used, the effect of grain size (from 0.01 to 0.10 mm. dia.) on the corrosion loss is very small and probably can be ignored for practical purposes. In general, however, the brass with smaller grain size tends to corrode less than that with larger grain size. The microstructural aspects of some corroded samples are described.

A paper entitled "Effect of Severe Cold Working on Scratch and Brinell Hardness," by Henry S. Rawdon and W. H. Mutchler, Bureau of Standards, Washington, was presented in abstract by Mr. Rawdon. Briefly the authors stated that cold-working is generally considered as a process of hardening metals. Diametrically opposite statements concerning the applicability of the scratch-hardness method in the testing of cold-worked metals, particularly after severe deformation, which exist in the technical literature led to the study of the results which are summarized in this paper. A series of metals, of which copper, iron and tin are used as illustrations, were cold rolled to a definite degree without any intermediate annealing and the hardness determined by both the scratch and Brinell methods. The results indicate that the metal hardens rapidly during the initial stages of deformation; however, after a certain stage, which corresponds to a rather definite microstructure, the metal becomes softer and in its final form may be softer than the metal in its initial stage.

New Institute Chairmen

Preceding the presentation of the foregoing papers, a business session was held at which George K. Elliott, chief metallurgist Lunkeneimer Co., Cincinnati, was elected the new chairman for the ensuing year and

George C. Stone, chief engineer New Jersey Zinc Co., 160 Front Street, New York, was elected vice-chairman. W. M. Corse was reelected secretary and treasurer. The new directors are: Prof. William Campbell, Columbia University; D. C. Crampton; S. L. Hoyt, General Electric Co., Schenectady, N. Y.; Col. A. F. White, University of Michigan; William A. Cowan; H. C. Jennison, Dr. H. W. Gillett; George F. Comstock; Dr. Zay Jeffries and Stanislaus Skowronsky. Professor Campbell, Mr. Cowan and Mr. Comstock were reelected.

An interesting round table discussion was the feature of the second session of this division on Wednesday afternoon, Feb. 20, with George K. Elliott as the chairman. The subject was "Fluxes and Deoxidizers," under the general charge of W. M. Corse, National Research Council, Washington. This was an unusually successful meeting, participated in by a large number and productive of a valuable record of various opinions.

St. Louis as an Iron and Steel Center

"St. Louis, the Coming Steel, Iron and Metal Center—and Why" is the title of a booklet published by the Mercantile Trust Co. of St. Louis. The booklet is an interesting compilation of articles by various men prominent in steel and allied industries of that city. It has a foreword by Festus J. Wade, president Mercantile Trust Co., and the articles which follow include: "Steel; and the Destiny of St. Louis," by Harry Scullin, president Scullin Steel Co.; "Coke," by George W. Niedringhaus, vice-president St. Louis Coke & Chemical Co. and president National Enameling & Stamping Co.; "Cheap and Abundant Coal," by W. K. Cavanaugh, president Southern Coal, Coke & Mining Co.; "Missouri Iron Ores," by Leonard A. Busby, president Iron Mountain Co.; "Re-opening of Iron Mountain; Its Influence Upon the Iron and Steel Industry at St. Louis," by L. W. Baldwin, president Missouri Pacific Railroad Co.; "Lead and Zinc," by Arthur Thacher, consulting engineer New Jersey Zinc Co.; "Non-Ferrous Metals," by William Lewin, president Lewin Metals Corporation; "St. Louis, Now a Seaport," by James E. Smith, president Mississippi Valley Association; "Electric Power in St. Louis," by Louis H. Egan, president Union Electric Light & Power Co.; "St. Louis Railroad Facilities," by Henry Miller, president Terminal Railroad Association of St. Louis; "St. Louis as an Iron and Steel Center," by Clarence H. Howard, president Commonwealth Steel Co.; "Mexico, Its Relation to St. Louis Steel," by Paul W. Brown, author of "America at Work."

The booklet contains the names of companies engaged in metal-working lines which are now located in St. Louis; also pictures of some of the leading St. Louis iron and steel and allied industries and data regarding the importance of St. Louis as the country's largest market place for a number of important lines, including hardware, steel furnaces, stoves and ranges, sugar mill machinery, open-hearth steel castings, lumber, drugs, boots and shoes, wool, sashes and doors and other items.

Advantages of St. Louis as a manufacturing center are stated as follows: 1. Center of nation and center of great producing and consuming area; 2. Low freight rates and unsurpassed shipping facilities; 3. Favorable labor conditions; 4. Cheap and abundant coal at door; 5. Cheap and abundant electric power; 6. Development of Mississippi River and Inland Waterways, providing cheap water carriage and insuring low railroad rates.

The mid-year safety conference of the Engineering Section, National Safety Council, Chicago Safety Council and Western Society of Engineers was held at the Morrison Hotel, Chicago, Feb. 19. At one session, devoted to woodworking hazards, the Use and Care of Saws was discussed by S. H. Disston, vice-president Henry Disston & Sons Co., Philadelphia, and the Safe Layout and Equipment of a Woodworking Plant or Department was the subject of an address by A. S. Kurkjian, Oliver Machinery Co., Grand Rapids, Mich.

Testing Society's Annual Meeting Week of June 23

The twenty-seventh annual meeting of the American Society for Testing Materials will be held at the Chalfonte-Haddon Hall, Atlantic City, N. J., during the week of June 23. Monday, June 23, will probably be confined to committee meetings with the first session devoted to technical papers on Tuesday morning, June 24. The committee on papers and publication reports that a number of new important subjects are to be brought before the session. The discussion which has been part of the program for the past two years on endurance tests for metals will be continued, especially as relating to hard alloy steels and hard-drawn brass and copper. Tests for the corrosion of metals will assume a prominent place. The entertainment committee is being organized under the chairmanship of W. M. Corse, National Research Council, Washington.

Safety Conferences to Be Held in Cleveland and San Francisco

The engineering section of the National Safety Council will join with the Cleveland Safety Council, the Society of Ohio Safety Engineers, and the Cleveland Engineering Society May 16 in a comprehensive safety conference in Cleveland. The general topics to be discussed by prominent safety men are "Safety Legislation and Codes" and "Plant Housekeeping." The speakers will be J. W. Patterson, Hydraulic Pressed Steel Co.; Dr. H. C. Davis; J. M. Woltz, Youngstown Sheet & Tube Co.; F. C. Allen, New York, and F. A. Scott, who will act as chairman at an informal dinner following the morning and afternoon sessions.

Industrial safety and health and public safety will be discussed by prominent leaders in the safety movement at the Pacific Safety Conference to be held at the St. Francis Hotel in San Francisco, April 7 to 9. The meetings are to be held under the joint auspices of the Society of Safety Engineers of California and the Engineering Section of the National Safety Council.

The first three sessions will be devoted to Industrial Safety and Health and the fourth to Public Safety. Plans have been made by many safety men in Washington, Oregon and California and Texas to attend this first big safety conference of the Pacific Coast.

Lewis A. DeBlois, president of the National Safety Council and Sidney J. Williams, chief engineer, will attend the sessions and will stop off in Washington and Oregon cities en route to San Francisco.

National Safety Congress at Louisville

The National Safety Council will hold its Thirteenth Annual Safety Congress in Louisville, Ky., Sept. 29 to Oct. 3, it was announced by W. H. Cameron, managing director, following a meeting of the executive committee in Chicago recently. The industrial sections of the council already have begun to plan programs for the sectional meetings at the congress and the business and industrial leaders of Louisville are organizing committees to arrange the many details and to cooperate with the officers of the National Safety Council in preparation. Officials are planning for an attendance of more than 4000.

Spring Meeting Program of Mechanical Engineers

A feature session at the spring meeting of the American Society of Mechanical Engineers at Cleveland will be a session held jointly with the American Society for Testing Materials on the subject of effect of temperature upon the properties of metals.

The importance of a more extended study of the behavior of metals at various temperatures has been recognized for some time and was recently brought to a head through the activities of a sectional committee on standardization of pipe flanges and fittings of which the American Society of Mechanical Engineers is one of the

sponsors. The use in central-station and power-plant installation, in oil refineries and elsewhere, of considerably higher temperatures and pressures than were prevalent even a few years ago, has emphasized forcibly the necessity of more exact knowledge regarding the behavior of metals at these elevated temperatures.

The four following papers will introduce the general discussion: Industrial Application of Metals at Various Temperatures by L. W. Spring, Crane Co.; Methods of Testing and Their Limitations by V. T. Malcolm, Chapman Valve Mfg. Co., Indian Orchard, Mass.; Available Data on the Properties of Iron and Steels at Various Temperatures by H. J. French; Available Data on the Properties of Non-Ferrous Metals at Various Temperatures by Prof. A. E. White, University of Michigan, and Clair Upthegrove.

Other sessions at the spring meeting will be devoted to the following subjects: Power Problems in the Steel Industry, Interchangeable Manufacture, Windmill and Fan Design, Aeronautic and Ordnance, Materials Handling in Industry. There will also be a joint session with the American Society of Refrigerating Engineers.

Regional Machine Tool Meeting

The National Machine Tool Builders' Association held a regional meeting at the Drake Hotel, Chicago, Feb. 26. Ralph E. Flanders, Jones & Lamson Machine Co., Springfield, Vt., who is president of the association, was in the chair. Ernest F. DuBrul, general manager of the association, was also present and displayed a number of charts to show the present status of the machine tool industry. The meeting was devoted largely to a general round table discussion of business conditions.

The Quad City Foundrymen's Association, Moline, Ill., had a very large attendance at its February meeting, at which E. T. Runge was the principal speaker. Mr. Runge gave a very interesting and instructive talk on foundry costs and substantiated the position that practical foundry costs could be obtained at a very reasonable cost. It is his opinion that many people attempt refinement in foundry costs that is very expensive and does not give results. His remarks were very enthusiastically received by the members present.

COMING MEETINGS

April

American Association of Oil Burner Manufacturers. April 1, 2 and 3. Annual meeting, Hotel Chase, St. Louis. Leod D. Becker, 518 Bank of Galesburg Building, Galesburg, Ill., secretary.

Association of Iron and Steel Electrical Engineers. April 2 and 3. Fuel saving conference, William Penn Hotel, Pittsburgh. John F. Kelly, Empire Building, Pittsburgh, secretary.

National Metal Trades Association. April 23 and 24. Annual convention at the Hotel Astor, New York. Louis W. Fischer, Peoples' Gas Building, Chicago, secretary.

American Electrochemical Society. April 24 to 26. Spring meeting at Philadelphia. Dr. Colin G. Fink, Columbia University, New York, secretary.

American Gear Manufacturers' Association. April 28 to 30. Spring meeting, Lafayette Hotel, Buffalo. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

Institute of Metals Division of American Institute of Mining and Metallurgical Engineers and the American Foundrymen's Association. April 28 to May 3, inclusive. Annual convention, Hollenden Hotel, Cleveland. C. E. Hoyt, 146 South Dearborn Street, Chicago, secretary.

Society of Industrial Engineers. April 30 to May 2. Annual convention at Buffalo. George C. Dent, 608 South Dearborn Street, Chicago, general manager.

Plans of New Companies

The Terminal Steel Supply Co., 50 Church Street, New York, recently organized to operate as an iron and steel merchant, will maintain warehouses at Brooklyn and Jersey City, N. J., and will deal in plates, sheets and wire nails. Arrangement has been made to represent the Angell Nail & Chaplet Co., Cleveland, for which it will handle roofing and special nails, and the Elwood Steel Corporation, Elwood City, Pa., for which it will handle cement coated nails and special fine nails. It will also handle plates for the Cleveland Steel Co., Cleveland. C. L. Altemus, formerly connected with the Cambria Steel Co., is president.

The Novo Refrigerating Corporation, care of Alexander Ginsburg, 63 Park Row, New York, has been incorporated with \$100,000 capital stock and will manufacture a new design of instantaneous refrigerating and filtering machinery. The company's plant is located in Germany, where parts will be manufactured, then shipped to Jersey City, where assembling will be done. The first lot of 200 machines will be completed by the end of March. C. N. Wunnenburg is president.

The Consolidated Can Corporation, 390 Hudson Street, New York, has been incorporated with \$15,000 capital stock to manufacture metal containers. The company is already operating in a three-story building with equipment complete. R. J. Pollock heads the company.

Henry Frank, Jr., Inc., 374 Hudson Street, New York, incorporated with capital stock of \$100,000, will operate as merchant in heavy hardware products. The corporation will take over a business which has been established in this field for many years. Mr. Frank also maintains a machinery exchange at Hoboken, N. J.

The Republic Radio-Craft Corporation, New York, has been incorporated with capital stock of \$25,000 to represent manufacturers of radio equipment. The management is interested in making a connection with a concern manufacturing reputable brands of complete receiving sets. Maurice Altman is president and Robert Robins, vice-president and general manager. Temporary address is in care of L. Feuerman, 38 Park Row.

The William H. Young Mfg. Co., 10 Bergen Boulevard, Little Falls, N. J., recently organized, will manufacture an automobile oil-level indicator known as the Master oil gage. In the immediate future the company plans to manufacture hardware specialties. Operations are being carried on in a leased plant of 3000 sq. ft., but negotiations are under way, whereby the company will build its own plant shortly at Henderson, N. J. Die castings and metal stamping work will be done by contract. The new company is an outgrowth of the Novelty Machine Co. and the Master Mfg. Co., whose equipment has been taken over. William H. Young, Jr., is president, J. S. Radcliffe, vice-president, and William H. Young, Sr., secretary-treasurer.

The Crippen Mfg. Co., Mt. Pleasant, Mich., recently organized, will manufacture Crippen bean pickers and will also do contract work along general machine shop lines. The company has a factory and is equipped to manufacture castings and other parts. Albert A. Frevert is president, A. H. Madsen, vice-president, and H. E. Chatterton, secretary-treasurer.

The York Foundry & Engine Works, York, Neb., has been incorporated to take over a business in the manufacture of grain elevator and mill equipment. The company owns a plant of 36,000 sq. ft. floor space, together with equipment, and maintains a warehouse at Omaha, Neb. Among its products will be elevating, conveying and power transmitting machinery, hardware specialties and all kinds of gray iron castings. It will also act as western distributor of Howe scales. The officers of the company are John H. Gellert, president and treasurer, George H. Gellert, vice-president, and Donald N. Gellert, secretary.

The Mills Radio Corporation, 109 East Davis Street, Raleigh, N. C., has been organized to manufacture radio equipment. It has leased a plant for the present and it appears likely that some of the work will be done by contract. No equipment is required at present. J. M. Mills is president, Dan Mills, vice-president, and W. H. Mills, secretary-treasurer.

The Northern Bronze Co., 601 West Hortter Street, Philadelphia, has been organized to manufacture brass, bronze and aluminum castings. It has leased a plant at 4212-20 Cresson Street, Manayunk, Philadelphia, which affords 8000 sq. ft. of floor space. No equipment is needed. Edward S. Oliver is president; James J. Keely, vice-president and A. Frederic Leopold, secretary-treasurer.

J. S. Timmons, Inc., 339 East Tulpehocken Street, Germantown, Philadelphia, has been organized to manufacture radio apparatus, continuing a business which has been in operation for three years. Arrangements have been made for additional floor space in another plant at Germantown. Its equipment is sufficient for present needs. J. S. Timmons is president and treasurer, W. J. McLaughlin, vice-president, and J. McL. Timmons, secretary.

The Barge Canal Drydock, Inc., care of Joseph A. Stone, 688 Ellicott Square, Buffalo, has been organized to do ship-building and repair work. It is only in the preliminary stages of organization and no definite policy has been decided upon as yet.

The Warmack-Williams Stove Co., Fort Smith, Ark., has been incorporated with \$30,000 capital stock and plans to manufacture six sizes of gas heaters and ranges at 1601 North Sixth Street. The company owns 38,000 sq. ft. of ground and plans an enlargement to its present plant in the near future. According to present plans a nickeling plant, engine room and warehouse will be built on the lot adjoining the present factory. The officers of the company are George Warmack, president; George H. Williams, vice-president; Hill Williams, secretary-treasurer, and John Warmack, general manager.

The Trey Air Cooled Motors Corporation, New York, recently incorporated with capital stock of \$200,000, will manufacture automobile engines. Offices will soon be taken in the Greenwich Bank Building. Mr. Trey's present address is Stamford, Conn. The company may be reached through R. H. Law, Jr., 521 West 34th Street, New York.

The Standard Auto Parts Co., Inc., 10 South Poplar Street, Charlotte, N. C. has been organized to act as distributor for ring gears, drive pinions, transmission gears, etc., handling General Electric Co. timing gears, axle shafts, roller bearings and similar lines.

The Fitz-Pat Products Corporation, 23 Main Street, Battle Creek, Mich., has been organized to manufacture metal screen doors. It is undecided as regards manufacturing, but it is likely that work will be done by contract. The officers of the company are Fred Wells, president; Barrett Hamilton, secretary; and L. J. Kuehule, treasurer.

Special Machinery Co., recently organized with \$50,000, has established headquarters at 40 Remer Street, Bridgeport, Conn., and will manufacture automatic labor saving machinery, tools for wire forming, and also metal and wire goods. The officers of the company are James W. Grant, president; Lucy Murphy, vice-president, and S. E. Walsh, secretary-treasurer.

The American Liquidating Co., Sixth Street and Atlantic Avenue, Camden, N. J., has been organized by B. A. Small, Philadelphia, and A. F. Strafer, New York. The company will buy metal-working manufacturing plants for purposes of liquidation. A warehouse has been acquired in Camden.

George H. Gibby, prominently identified with the Gibby Foundry Co., Candor Street, East Boston, is treasurer, and Alfred E. Perrin, 38 Union Street, Boston, is president of the Gibby Heater Co., Boston, capitalized for \$50,000 and recently incorporated under the laws of Massachusetts to manufacture boilers, heaters and appliances and appurtenances.

The Emerson-Scheuring Tank Co., Indianapolis, recently incorporated, has started the manufacture of oil storage tanks and other arc-welded steel plate products, in a portion of the plant of the Burpee-Johnson Co., manufacturer of shock absorbers, at Singleton Street and the Belt Railroad. The company occupies about 6000 sq. ft. of floor space and has placed about \$10,000 worth of machinery and other equipment for electric arc-welding purposes. Some additional equipment will be purchased later on after the business is better established. W. J. Emerson is president, C. E. Scheuring, vice-president and general manager, and M. R. Scheuring, secretary-treasurer.

The Emerson Radio Corporation, 307 Sixth Avenue, New York, has been incorporated with \$200,000 capital stock to manufacture and distribute a combination phonograph and radio outfit. The company has a factory in operation in the Middle West and plans for production on a large scale in the immediate future. At the New York address, a completely equipped service and engineering department will be maintained and in addition to the major product, the company will act as wholesaler in general radio equipment. B. Abrams, president Emerson Phonograph Co., is president of the new concern; William Watson, secretary-treasurer; F. A. Kleindienst, vice-president, and M. J. Lauer, general manager.

The Ramapo Hardware Co., 165 Chambers Street, New York, has been incorporated with \$50,000 capital stock to manufacture and deal in hardware specialties. The company is beginning in a small way and its activities will be limited for some time. The incorporators are A. Rowen and H. J. Hagen.

The Metcalf Mfg. Co., Brooklyn, has been incorporated with capital stock of \$50,000 to manufacture cabinets and kindred lines. It has taken over the business of a Buffalo concern, which will be moved to Brooklyn to resume operations somewhere in Queens County. A location has not yet been found. E. H. Metcalf, J. C. Becker and W. Hein are the incorporators. Temporary address is in care of E. M. Harris, 90 West Broadway, New York.

Trade Changes

The Dale Machinery Co., Chicago, has been appointed exclusive representative in Chicago territory for the Henry & Wright Mfg. Co., Hartford, Conn., maker of sensitive drills and dieing machines.

The plant of the Romer Axe & Tool Co. at Dunkirk, N. Y., has been acquired by the Warren Axe & Tool Co., Warren, Pa. The new owners plan to reopen the Dunkirk plant, which has been closed for some time, as the Romer division within a few days.

The Noble Machinery Company, 3 Howard Street, New York, has moved to 237-9 Lafayette Street.

The Great Lakes Distributing Co., miner and shipper of foundry sands and distributor of coke, has moved offices from 1226-8 to 1364-8 Penobscot Building.

The William J. Guest Machine & Tool Works, Baltimore, has moved from 927 Linden Avenue to larger quarters at 250 West Preston Street.

The Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, has opened a district sales office in the General Motors Building, Detroit, in charge of Harold Davey, who has been appointed district sales manager.

The Kent Engineering Co., district representative of the Conveyors Corporation of America, 326 West Madison Street, Chicago, has changed its address from 504 First National Bank Building to 1110 Farnam Street, Omaha, Neb.

The Stocker-Rumely-Wachs Co., machine tool dealer, Chicago, has been appointed exclusive representative in the Chicago, Milwaukee and Grand Rapids territories for the knee type and vertical milling machines manufactured by the Garvin Machine Co., New York.

The Truscon Steel Co., whose Chicago offices are now located in the Majestic Building, has leased a building at the southwest corner of Erie and St. Clair Streets, and will move to those quarters on May 1.

The Poldi Steel Corporation of America, with head offices at 151 Bank Street, New York, announces the opening of a Philadelphia district branch in the Otis Building, that city, in charge of T. J. McAndrew, formerly Baltimore district sales agent. P. H. Schell, for many years connected with the Crucible Steel Co. of America, has been appointed Baltimore district sales agent with headquarters at 17 North Guilford Avenue. James W. Sessums has been appointed agent for Poldi products in Mexico, Guatemala, Salvador, Honduras, Nicaragua, Costa Rica and Panama, with headquarters at Apartado No. 165, Mexico, D. F., Mexico.

The Michigan Iron & Chemical Co. has moved general offices to 616 South Michigan Avenue, Chicago.

The Jones Metal Products Co., West Lafayette, Ohio, has purchased the plant and equipment of the Lafayette Stamping & Enameling Co., at receiver's sale. The Jones company is making hospital and kitchen enameled ware and also doing special enameling.

D. R. Clarkson & Co., Inc., 153 Railroad Street, Rochester, N. Y., has established a branch office at 41 Erie Street, Buffalo. C. E. Perkins has been appointed manager.

The Nieldow-Cummings Co. has changed its name to the E. C. Cummings Co. and has moved to 542 Washington Boulevard, Chicago.

The McMinn & Quigley Steel Co., dealer in cold rolled strip steel, tool and alloy steels, has moved from 40 Central Street to room 826 Park Square Building, Boston.

The Cannon-Stein Steel Corporation, 230 West Willow Street, Syracuse, N. Y., steel specialist in tools, alloy and high-speed steels, drill rods, etc., has recently taken a long-term lease of the ground floor from the Syracuse Chilled Plow Co. The company expects to have the new quarters at Marcellus and Wyoming Streets fitted up for occupancy about April 15.

The Carlton Machine Tool Co., Cincinnati, announces the appointment of the Laughlin-Barney Machinery Co., Union Trust Building, Pittsburgh, as sales agent in the Pittsburgh district for ball bearing radial drills.

William L. Hoffman, district sales representative in Philadelphia for the Mansfield Sheet & Tin Plate Co., the Ashtabula Sheet Steel Co., the J. W. Brainard Steel Co. and the S. Severance Mfg. Co., has moved from the Land Title Building, that city, to 1504 West Venango Street, which is near the North Philadelphia station of the Pennsylvania Railroad.

Industrial News Items

The Insley Mfg. Co., Indianapolis, manufacturer of construction equipment, is planning a \$40,000 addition to its plant at Olney Avenue and St. Clair Street to facilitate the manufacture of a new gasoline excavator. The device is unique in the excavating field and is designed to bridge the gap between manual shoveling and the work done by the larger steam shovels. The company states that the shovel is of comparative low initial cost and will make mechanical handling devices available for routine work where the use of a larger steam shovel is unwarranted. The company plans to extend its machine shop and install some new machinery later on but no further equipment, outside of what has been ordered, will be purchased at this time. W. H. Insley is president of the company.

Warren D. Oakes, president of the Oakes Co., Indianapolis, discussing the recent consolidation of the Oakes Co. with the Martin-Parry Corporation, said that the consolidation with the Martin-Parry Co. will greatly enlarge the facilities of the Oakes Co. There has been no change in the management, and the company expects to greatly increase its equipment in the near future. There will be no change in its position as a manufacturer of automobile fans and tire carriers and other accessories. The enlarged facilities of the company will enable it to develop these lines more intensively.

L. O. Koven & Brother, Inc., 154 Ogden Avenue, Jersey City, N. J., recently incorporated, has taken over the assets of the Hoevel Mfg. Corporation, which was dissolved last December, and the new company will continue the manufacture of Hoevel sand blast machinery. It will operate a sheet steel, sheet iron and copper works, manufacturing high pressure galvanized range boilers, expansion tanks, hot water storage tanks, gasoline and pressure tanks, etc. Present plans contemplate the expansion of plant and a larger scope of products, for the manufacture of which new equipment will be installed from time to time. Authorized capitalization according to the new charter is \$2,000,000, of which \$1,600,000 is paid-in capital. Warerooms will be maintained at 50 Cliff Street, New York, and a Western branch has been established with headquarters at 941 Engineers Building, Cleveland, with Ray L. Burnside as manager. The officers are as follows: G. H. Koven, president; L. O. Koven, vice-president and treasurer; William Schulmerich, secretary. J. M. Betton is manager in charge of the sandblast department at the home office.

C. A. Ilgenfritz, who recently resigned as vice-president of the Stroh-Ilgenfritz Co. to become assistant purchasing agent Youngstown Sheet & Tube Co., has been succeeded by Henry A. Butler. The name of the company has been changed to the Stroh-Butler Co. The directors, in addition to J. R. Stroh and Henry A. Butler, are W. H. Wulf, W. E. Beadling and J. G. Butler, Jr. The Stroh-Butler Co. will continue the business of the old company, representing producers, and dealing in coal, coke, alloys, fluorspar, steel, fire brick, fire clay and fuel oil. Prior to the formation of the Stroh-Ilgenfritz Co., Mr. Ilgenfritz was purchasing agent for the Brier Hill Steel Co., Youngstown. Before going with that company in 1913 he was with the Youngstown Sheet & Tube Co. for seven years. These changes became effective March 1.

New Sales Plan of Ashland By-Product Coke Co.

The Ashland By-Product Coke Co., Ashland, Ky., has formed its own sales organization for the handling of sales of Ashland Solvay foundry coke manufactured by the company in its by-product plant at Ashland and heretofore handled through Eaton, Rhodes & Co. under an exclusive sales agency contract which will expire March 31. After that date, all sales will be handled by the company's own organization, under the general direction of D. H. Putnam, secretary-treasurer. The company has opened a Cincinnati office in the Dixie Terminal Building in charge of John R. Warner, at present purchasing agent of the company; and a Cleveland office in the Union Trust Building in charge of Samuel Weiss, who has been connected with the Detroit sales office of Semet-Solvay Co. for a number of years.

The plant and general offices are at Ashland, where the company produces foundry, domestic and furnace coke. It owns and operates through a subsidiary company large coal mines in the Elkhorn field of eastern Kentucky.

Machinery Markets and News of the Works

BUYING IS CONSERVATIVE

Inquiries Are Numerous, but Machine-Tool Users Are Slow in Ordering

Railroads and Automotive Companies Are the Principal Purchasers—Order and Inquiry from Germany

The trend of machine-tool buying shows no change. Railroads and automotive companies are the principal buyers of the larger units. Industrial companies have sent out a good many inquiries, but are slow in buying.

An interesting development is the receipt of an order for one or two machines from Germany, and an inquiry from that country for three tools is pending.

The Studebaker Corporation is buying tools in con-

siderable volume for its South Bend, Ind., and Detroit plants. The Standard Sanitary Mfg. Co. is reported to have begun placing orders for tools for its new Baltimore plant, and is expected to issue a list for its Louisville, Ky., plant soon. Two Chicago steel companies are inquiring for a few tools each.

The Canadian National Railways are expected to place orders soon for considerable machine-tool equipment for their Canadian shops, and they have also issued a list of tools required at the Grand Trunk shop at Battle Creek, Mich. The Big Four has begun buying on its recent list and orders from the Southern Railway will probably be sent out soon. The Santa Fe has issued inquiries for 10 additional machines. The New York Central is asking for prices on 10 or 12 lathes.

New York

NEW YORK, March 4.

INQUIRIES are fairly numerous, but the volume of orders shows no marked improvement. Buying in the Buffalo territory is somewhat better than in sections further east. The New York Central Railroad is getting new bids on tools which had previously been quoted on. An inquiry last week covered 10 or 12 engine lathes. Among the more important orders of the week were the following: Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., 12-ft. boring and turning mill; New York Central, 30-in. x 10-ft. planer; Ingersoll-Rand Co., New York, 8-ft. radial drill; By-Products Coke Corporation, South Chicago, Ill., 53-in. boring mill; Castile Mining Co., Minnesota, 800-lb. steam hammer.

Manual training equipment will be installed in an annex to be built separately for shop work, upon the completion of the new high school on East Williston Road, L. I., estimated to cost \$250,000. W. B. Tubby, 81 Fulton Street, New York, is architect.

The Wire Wheel Corporation of America, 1700 Elmwood Avenue, Buffalo, is in the market for two Elwell-Parker electric lift trucks, type E. G., with 4½-in. lift, or a similar type of another make.

W. Williams, P. O. Box 552, New York, is inquiring for several lifting magnets, sizes 36-, 43- and 52-in., complete with controllers.

Plans have been completed by the Empire Fire Proof Door Co., 435 Southern Boulevard, New York, for a one-story addition, 55 x 100 ft., to cost about \$23,000. Morris True is president.

The Bureau of Yards and Docks, Navy Department, Washington, has plans in progress and will soon take bids for ash-handling equipment for installation at the Brooklyn Navy Yard, specification 4959.

The Hardware Stamping Co., 182 Avenue C, New York, is planning for the purchase of a power squaring shear, 36-in. or larger.

A machine shop, automobile service and repair works, steam power plant and other mechanical departments will be installed in the proposed State arsenal to be erected on the block bounded by Second and Third Avenues, Sixty-third and Sixty-fourth Streets, Brooklyn, comprising a six-story structure, 100 x 400 ft., to cost in excess of \$1,200,000. The motor service and machine departments will be equipped for army motor truck work, etc. Bids will be asked about March 15 by the State Arsenal Commission, Albany, N. Y. Sullivan W. Jones, Yonkers, N. Y., is architect.

The Eighth Avenue Railroad Co., 825 Eighth Avenue, New York, has awarded contract to Babor Comeau & Co., 132 East Fortieth Street, for a two-story car barn and shop,

52 x 100 ft., at Eighth Avenue and 155th Street, to cost \$55,000. James D. Kent, company address, is architect. Joseph Tate is president.

The General Railway Board, Pacific Railway, Bogota, Colombia, has approved plans for the construction of new locomotive and car repair shops at Cali, Colombia, with machinery installation estimated to cost \$200,000, for which orders will be placed in the near future. The Colombian Northern Railway Co., Bogota, is planning for the erection of new locomotive shops and will prepare a list of equipment at an early date. The Bogota Street Railway Co., Bogota, has authorized the construction of new car shops, with equipment estimated to cost \$100,000. The Tolima Railway Co., Tolima, Colombia, has plans for new locomotive and car repair shops, with machinery installation to cost approximately \$80,000. Further information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference No. 14917.

The Wilson Mfg. Co., 137 Grand Street, New York, manufacturer of tools, etc., is planning for the installation of a power press, Bliss type.

Moore & Landsiedel, Third Avenue and 148th Street, New York, architects, are completing plans for a two and one-half story automobile service and repair building, 120 x 158 ft., estimated to cost \$80,000.

The Air Reduction Co., Inc., 342 Madison Avenue, New York, manufacturer of industrial oxygen, acetylene apparatus, etc., is arranging an expansion program for the present year, to include the erection of new plants at Harrisburg, Pa., and Lima, Ohio, for which sites have been purchased.

E. J. Trum, Inc., 55 Third Street, Brooklyn, manufacturer of paper boxes and containers, is taking bids on a general contract for a three-story addition, 100 x 150 ft., at 764-76 Fourth Avenue, to cost \$125,000 with machinery. William Higginson, 15 Park Row, New York, is architect.

The Industrial Machinery Division, Room 815, Bureau of Foreign and Domestic Commerce, Washington, will receive catalogs and information regarding two cycle semi-Diesel engines for the office of the Trade Commissioner of the department at Manila, P. I., which has received requests for such American equipment, reference No. 320-13/17.

The Mexican Petroleum Co., Ltd., 120 Broadway, New York, an interest of the Pan-American Petroleum & Transport Co., same address, will build a pipe line from Ebano to its storage plant at Tankville, near Tampico, Mexico, to include the installation of a pumping plant, booster power station and two reheating stations, for heavy oil handling.

The Department of the Postmaster General, Brisbane, Australia, will take bids until June 25 for automatic telephone equipment, including switchboards, instruments, etc., for installation at Albion, Newmarket and Queensland, as per information on file at the office of the deputy postmaster general, Brisbane.

The American Locomotive Co., 30 Church Street, New York, has arranged a fund of \$4,500,000 for extensions and

The Crane Market

WHILE the volume of inquiries for overhead cranes continues large, prospective purchasers are still inclined to delay award of business. The General Electric Co., Schenectady, N. Y., is in the market for a 50-ton, 80-ft. span, mill type overhead traveling crane for Erie, Pa. This brings the total of overhead cranes for this company to eight; two 100-ton and two 10-ton for Pittsfield, Mass., and a 10-ton, 15-ton and 30-ton for Schenectady, N. Y. Companies in the New York district with inquiries include the Western Electric Co., six cranes; Dwight P. Robinson & Co., New York, 11 cranes for the Southern Railway, also issued direct; Anaconda Copper Mining Co., New York, three 6-ton cranes; Lehigh Valley Railroad, New York, a 30-ton overhead and a 25-ton gantry crane; De La Vergne Machine Co., New York, electric hoists and a 10-ton overhead crane. The Philadelphia & Reading Co., Philadelphia has closed on a 4-ton, 99-ft. span grab bucket crane and the Metal Wells Service Corporation, Philadelphia has bought a 10-ton, 40-ft. span overhead crane from a local builder. The Atchison, Topeka & Santa Fe Railroad is inquiring for a 15-ton electric traveling crane.

Among recent purchases are:

Stevens & Wood, Inc., 120 Broadway, New York, a complete coal-handling plant, including unloading towers with 4-ton buckets, conveyor belts, crushers, screening equipment, railroad hoppers and a tower and cableway system for handling coal to and from storage pile of several hundred thousand tons, for the Ohio River Edison Co., Toronto, Ohio, from Heyl & Patterson, Inc.

General Electric Co., Schenectady, N. Y., a 25-ton over-

head crane with 5-ton auxiliary for Evarts, Mass., from the Chesapeake Iron Works.

Westinghouse Electric & Mfg. Co., a 10-ton, 47-ft. 3-in. span, 4-motor overhead crane with 3-ton auxiliary, for Trafford, Pa., from the Milwaukee Electric Crane & Mfg. Co.

American Sheet & Tin Plate Co., Pittsburgh, a 30-ton, 56-ft. 6-in. span overhead crane with 7½-ton auxiliary, for installation in Ohio from the Shaw Electric Crane Co.; one 40-ton, 48-ft. 2-in. span crane with 10-ton auxiliary for the Guernsey works, Cambridge, Ohio, from the Morgan Engineering Co.; and one 15-ton, 73-ft. span bar storage yard crane for the Mercer works, Farrell, Pa., from the Cleveland Crane & Engineering Co.

Canadian National Railways, Montreal, a 160-ton wrecking crane from the Industrial Works.

Pickands, Mather & Co., Cleveland, a 40-ton locomotive crane from the Industrial Works.

Bradford Corporation, Chicago, a 5-ton, 61-ft. span, 3-motor electric transfer crane, cage control, from H. D. Conkey & Co.

City of St. Paul, Minn., Department of Water Supply, a 7½-ton, 36-ft. 4-in. span, 3-motor, floor-controlled, overhead crane from H. D. Conkey & Co.

Joseph T. Ryerson & Son, Chicago, a 1-ton, 13-ft. span, hand power crane, from H. D. Conkey & Co.

Pennsylvania Railroad, a 10-ton, underhung traveling crane from H. D. Conkey & Co.

improvements in different plants during the year and the replacement of present machinery with new equipment.

The New York Dock Co., 44 Whitehall Street, New York, has awarded a general contract to the A. J. Contracting Co., 25 West Forty-third Street, for extensions and improvements in its plant at Wharf Avenue, Brooklyn, estimated to cost \$50,000. C. E. Hicks is company architect and engineer.

L. D. Van Hoesen, 2785 Sixth Avenue, Troy, N. Y., has had plans drawn by A. K. Mosely, Franklin Square, architect, for a one-story automobile service and repair building on Fifth Avenue, between 105th and 107th Street, estimated to cost \$200,000 with equipment.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, will soon commence superstructure work for an addition to its generating plant at Locust Avenue and 132nd Street, known as the Hell Gate Station, to cost in excess of \$500,000.

The Rubel Coal & Ice Corporation, Glenmore Avenue, Brooklyn, has acquired property on Newtown Creek, 185 x 320 ft., for the construction of a new dock equipped with coal-handling and other machinery estimated to cost \$75,000.

The Peerless Unit Ventilator Co., 437 West Sixteenth Street, New York, has plans for a new factory at Long Island City, one and two-stories, 100 x 100 ft., estimated to cost \$38,000. John M. Baker, 9 Jackson Avenue, Long Island City, is architect.

The Jeffrey Mfg. Co., 30 Church Street, New York, manufacturer of elevating and conveying machinery, with main plant at Columbus, Ohio, has leased space in the Shupe Terminal, Kearny, N. J., for an Eastern factory branch and distributing plant.

The Fiber Stone & Tile Works, Inc., Sewaren, N. J., recently formed with a capital of \$1,000,000, has acquired property for a new plant to manufacture artificial fiber, stone, tile and kindred products, estimated to cost \$85,000 with machinery. The company is headed by Enoch W. and Stanley W. Ketcham. George Hymes is local representative.

The International Motor Co., 1449 West Front Street, Plainfield, N. J., has plans for a four-story addition, 85 x 225 ft., for service and parts work.

The Arthur B. Shepard Co., 1836 Euclid Avenue, Cleveland, manufacturer of fabricated steel buildings, has completed plans for a one-story fabricating and assembling plant, 150 x 200 ft., at Irvington, N. J., for which site recently was acquired.

Greene, Tweed & Co., 109 Duane Street, New York, manufacturer of adjustable pipe wrenches, etc., has filed plans for a three-story addition, 35 x 95 ft., to its plant at 9 Liberty Street, Newark, N. J., to cost \$35,000, for which a general contract has been awarded to Enstice Brothers, 111 Academy Street, Newark.

C. S. White, purchasing agent New York Central Railroad, 466 Lexington Avenue, New York, will take bids until March 14 for one 2500 kw. synchronous converter; one 2000-kw. motor-generator set, etc., serial contract No. 6-1924.

Philadelphia

PHILADELPHIA, March 3.

HENRY LEVIS & CO., Commercial Trust Building, Philadelphia, engineers, have inquiries out for 30 4-yd. capacity dump cars, two-way, 36-in. gage.

The Edward Wilkie Motors Co., 917 North Broad Street, Philadelphia, has purchased the two-story service and repair building, 50 x 160 ft., at 1415 North Broad Street, for a consideration of \$250,000, and will occupy the structure for a new works.

The Atwater-Kent Mfg. Works, Inc., 4937 Stenton Avenue, Philadelphia, manufacturer of electrical equipment, radio apparatus, etc., has awarded a general contract to Irwin & Leighton, 126 North Twelfth Street, for its one-story plant at Wissahickon Avenue and Abbottsford Road, to cost \$800,000 with machinery. The Ballinger Co., Twelfth and Chestnut Streets, is architect.

William Sellers & Co., Hamilton and Sixteenth Streets, Philadelphia, manufacturers of machine tools, etc., have plans for the construction of an addition, for which a general contract will soon be let. The cost is reported at \$50,000.

The Foreign Trade Department, Philadelphia Commercial Museum, has received an inquiry from a company at Mukden, China, desiring to purchase complete machinery for a cement manufacturing plant; also machinery for a municipal electric light and power plant, No. 42025.

The Heintz Mfg. Co., Front and Olney Streets, Philadelphia, manufacturer of steel automobile bodies, etc., has awarded a general contract to the W. F. Newberry Co., Otis Building, for a one-story addition, 70 x 200 ft., estimated to cost \$100,000 including machinery.

The Autocar Co., Ardmore, Pa., manufacturer of motor trucks, has engaged Horace W. Castor, Stephen Girard Building, Philadelphia, architect, to prepare plans for its one and two-story service and repair works, 142 x 200 ft., on site recently purchased at Philadelphia, to cost \$300,000 with equipment. David S. Ludlow is president.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has awarded a general building contract to the John N. Gill Construction Co., 121 North Broad Street, for a power house at Arch and Eleventh Streets, to cost \$125,000.

The Electric Storage Battery Co., Rising Sun and Adams Streets, Philadelphia, has engaged the William Steele & Sons Co., 219 North Broad Street, architect and contractor, to prepare plans for an addition, for which details are temporarily withheld.

The Baldwin Locomotive Works, Philadelphia, has commenced the removal of its local plant to the works at Eddystone, near Philadelphia, at a cost of \$15,000,000. About \$2,500,000 will be expended at the Eddystone plant to accommodate the expansion.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, will commence the erection of a new oil storage and distributing plant, with storehouse at Wilmington, Del. Plans are also under advisement for the enlargement of the transfer yards and buildings at Newberry Junction, and the installation of additional equipment.

The J. L. Mott Co., Hancock Avenue, Trenton, manufacturer of enameled iron plumbing equipment, has awarded a general contract to the N. A. K. Bugbee Co., 206 East Hanover Street, for two one-story additions to cost \$22,000.

T. Stephen, Temple Building, Camden, N. J., architect, has plans for a two-story automobile service and repair building, 50 x 285 ft., to cost \$85,000 with equipment, for which the owner's name is temporarily withheld.

The Pottsville Water Co., Pottsville, Pa., plans for the installation of electric-operated pumping machinery in connection with its new 500-million gal. capacity reservoir and system, at Indian Run, Pa., estimated to cost \$1,000,000 with equipment. It is expected to require about 24 months for completion.

The Light Mfg. & Foundry Co., Union Street, Pottstown, Pa., manufacturer of iron castings, wire wheels, etc., has acquired the local branch plant of the Bethlehem Motors Corporation, consisting of eight buildings on a 3-acre tract. A portion of the equipment is included in the transaction. The new owner will occupy the plant for a machine shop, automobile assembling and kindred work. The Bethlehem company has its main plant at Allentown, Pa., and it is proposed to keep this work in service.

The Buckwalter Stove Co., Royersford, Pa., manufacturer of stoves, heaters, etc., has plans for the early erection of a one-story addition, 100 x 380 ft.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is reported to be planning the construction of a new engine house, with repair shops, in the vicinity of Harrisburg, Pa., to cost about \$200,000 including equipment.

The D. M. Page Motorcycle Co., Williamsport, Pa., has plans under way for a two-story automobile service and repair building, 50 x 110 ft., estimated to cost \$145,000 with equipment. Bids will be asked in about a month.

The Gomery-Schwartz Motor Car Co., Inc., 128 North Broad Street, Philadelphia, representative for the Hudson and Essex automobiles, is planning the erection of a new branch at Harrisburg, Pa., with repair and service building, 87 x 107 ft., adjoining a new office and showroom, 35 x 160 ft. It will cost in excess of \$100,000 with equipment. The local works are at Seventeenth and Derry Streets, with F. P. Clark, local manager.

The Hahn Motor Co., Hamburg, Pa., has awarded contract to Butz & Clader, Allentown, Pa., for a two-story, 60 x 120 ft., brick assembling plant at Seventh and Allen Streets, Allentown.

Steam ovens and other equipment will be installed by the Anderson Baking Co., Warren, Pa., which is fitting out a new plant.

The brass foundry of the William Cramp & Sons Ship & Engine Building Co. has booked a number of orders recently of considerable importance in the marine field. These include propeller blades for nine steamships of the United States Shipping Board fleet and manganese bronze propeller blades aggregating about half a million pounds and constituting the requirements of the Government merchant fleet for six months.

Buffalo

BUFFALO, March 3.

CONTRACT has been awarded by the Rochester Gas & Electric Co., Rochester, N. Y., to the Ferro-Concrete Co., Cincinnati, for a three-story machine and mechanical shop, with warehouse department, 90 x 220 ft.

The Fedders Mfg. Co., 57 Tonawanda Street, Buffalo, manufacturer of automobile radiators and other metal products, has acquired property fronting on Scajaquada Creek, 120 x 175 ft., and adjoining site, 50 x 71 ft., and is said to have plans in preparation for the construction of additions. The nickel plating department, now occupying leased quarters, will be removed to the new works. L. F. Fedders is president.

The American Radiator Co., Elmwood Avenue, Buffalo, has arranged for the removal of a portion of the equipment at its local plant to the works of the Detroit Lubricator Co., 5938 Trumbull Street, Detroit, recently acquired as a subsidiary interest, consisting for the most part of brass-working machinery. All iron-working equipment will be retained at the Buffalo plant and operations concentrated here in this line instead of independently as heretofore. The Detroit

works will be extended and improved for exclusive brass specialty production. The company is taking bids for the erection of a two-story addition to its Buffalo plant, for research and other operating service. Bley & Lyman, 250 Delaware Avenue, are architects.

The A. H. Coplan Co., Hull, Que., is perfecting plans for the construction of a new foundry near Ogdensburg, N. Y., for the production of iron and steel castings, estimated to cost \$55,000 with equipment.

The Common Council, Watertown, N. Y., has tentative plans for the purchase of tools and equipment for a municipal automobile service and repair works. J. W. Ackerman, city manager, is in charge.

The Corning Industries, Inc., Corning, N. Y., is taking bids until March 13 for the erection of a one-story steel and concrete plant, 100 x 300 ft., for mechanical and other production.

Officials of the Sage Radiator Co., Syracuse, N. Y., manufacturer of automobile radiators, etc., have organized the Sage Economy Radiator, Inc., to operate a new branch plant at Watertown, N. Y., now being constructed. Equipment will soon be installed to give employment to about 100. It is expected to commence operations early in April.

The Jamestown Panel Co., Jamestown, N. Y., will soon take bids for a two-story addition to its plant on Steel Street, 40 x 130 ft., estimated to cost \$23,000, exclusive of equipment. Beck & Tinkham, Phillips Building, are architects.

The Buffalo Bed Spring Co., 154 Oak Street, Buffalo, will commence the erection of a one-story addition to cost \$26,000, for which a building permit has been issued.

The Watertown Radio Service Co., 112 Park Street, Watertown, N. Y., plans the installation of a lathe, post drill and other equipment. J. B. Scott heads the company.

The Robertson-Cataract Electric Co., Buffalo, manufacturer of electrical apparatus, has formed the Utica Electrical Supply Co., to operate a branch works at 25 Whitesboro Street, Utica, N. Y.

Contracts soon will be let for the construction of an addition, 129 x 500 ft., to the plant of the Lapp Insulator Co., Le Roy, N. Y. Capacity will be doubled with the completion of the new structure, estimated to cost \$225,000.

St. Louis

ST. LOUIS, March 3.

BIDS will soon be asked by the American Fixture & Showcase Mfg. Co., 1009 Lucas Avenue, St. Louis, for a four-story plant, 58 x 214 ft., to cost approximately \$160,000 with equipment. Corrubia & Henderson, Arcade Building, are architects.

The Oklahoma Gas & Electric Co., Ada, Okla., operating the Southern Oklahoma Power Co. and other State utilities, is disposing of \$2,000,000 in notes, a portion of the proceeds to be used for extensions in power plants and system.

The Brock Engineering Corporation, 698 Arcade Building, St. Louis, is said to be arranging a fund of about \$35,000 for the establishment of its plant to manufacture feed-water equipment.

The Townsend-Bohn Motor Car Co., St. Louis, has leased a one-story building to be erected by the Butts Realty Co. at Kingsland and Olive Streets, 100 x 140 ft., for a service and repair works, estimated to cost \$90,000 including equipment. John C. Stevens, St. Louis, is architect.

Manual training equipment will be installed in the new high school to be erected at Emporia, Kan., estimated to cost \$250,000, for which bids are being asked on a general contract until March 25. J. H. Felt & Co., Emporia, are architects.

The Jackson County Light, Heat & Power Co., Independence, Mo., is planning for extensions in its plant and system, including the installation of additional equipment, estimated to cost \$80,000. D. S. Milne is superintendent.

The Board of Education, Topeka, Kan., has construction in progress on a manual training building at Eighth and Harrison Streets and plans the installation of tools and equipment at an early date. M. C. Holman is clerk.

The Wabash Railway Co., St. Louis, has preliminary plans for rebuilding the portion of its shops at Decatur, Ill., destroyed by fire Feb. 26 with loss estimated at \$700,000 including equipment. Four large shops were demolished.

The Common Council, Pawhuska, Okla., is planning for the installation of additional equipment at the municipal electric plant, including a Diesel engine, oil-operated, electric generator, exciter and auxiliary apparatus.

The Kansas City Bolt & Nut Co., Independence Avenue, Kansas City, Mo., has awarded a general contract to the

Kansas City Structural Steel Co., Kansas City, Kan., for steel superstructure framing for its one-story addition, 85 x 250 ft., estimated to cost \$50,000.

The Missouri Rubber Products, St. Joseph, Mo., has plans for the first unit of its plant at Garfield Avenue and Twenty-second Street, estimated to cost \$400,000. Other units will be constructed later.

A manual training department will be installed in the new two-story and basement high school to be erected at Great Bend, Kan., estimated to cost \$200,000, for which bids will soon be asked on a general contract. Thomas W. Williamson & Co., Central National Bank Building, Topeka, Kan., are architects.

C. T. Davis, 319 North Fourth Street, St. Louis, is in the market for a 50-hp. oil engine, belted or direct connected to three-phase alternator; also a 75 and 100-hp. oil engine.

Electrical pumping and other equipment will be required for extensions and improvements to be made at the municipal waterworks, Shidler, Okla. A bond issue of \$120,000 is being arranged.

New England

BOSTON, March 3.

MOST machine tool dealers continue to report good inquiries but small sales. The market, however, appears a little more active. A Lynn manufacturer has purchased a large milling machine, making two such tools bought recently, and has placed a good order for presses with a Providence builder. Four vertical milling machines figures is the past week's business, while an East Boston plant closed on used Warner & Swasey lathes and smaller equipment against a list recently issued. Half a dozen Connecticut manufacturers, including a machine tool builder at Bridgeport, have taken a moderately large amount of used equipment. The Boston Elevated Railway will spend several more million dollars on its new Everett car repair shops and equipment.

The lack of active business has brought out some low prices on good used tools. Regular machine tool builders' representatives as a rule are maintaining list prices, yet new tools have been offered and sold at concessions where competition is keenest.

The small tool and machine tool parts business is excellent and the salvation of some machine-tool houses. In this connection it may be said the Greenfield Tap & Die Corporation, Greenfield, Mass., is operating at 75 per cent of capacity. The company's customers are buying conservatively, as is illustrated in the greatly increased number of orders received daily, and the decreased average value per order. There clearly is no stocking up going on. The Geometric Tool Co., New Haven, Conn., is booking a large business weekly, and the Pratt & Whitney Hartford plant is more active than it has been in some time.

Fire recently destroyed machine shops and other buildings at Shives Athol, N. B., the property of Stetson, Cutler & Co., Boston and Bangor, Me.

Chester S. Hathaway, New Bedford, Mass., has awarded a contract for the erection of a foundry and machine shop addition. Plans are private.

The Builders Iron Foundry Co., 9 Coddling Street, Providence, R. I., has abandoned its proposed one-story, 35 x 80 ft. machine shop, bids for which were submitted some time ago.

Contract has been awarded by the National Can Co., 36 North Washington Street, Boston, for a one-story, 120 x 160 ft. plant on Locust and Von Hillern Streets, Dorchester. Krokyn & Brown, 7 State Street, Boston, are the architects.

Contract has been awarded for a one-story, 88 x 118 ft. power station addition on Glenville Terrace, Allston, Boston, by the Edison Electric Illuminating Co., Boston. The Bigelow & Wadsworth Co., 79 Milk Street, Boston, are the architects.

A contract has been awarded for the Central High School on Russell Avenue, Watertown, Mass., which will contain shops. George M. Chamberlain, 24 South Market Street, Boston, is chairman of the school house commission. McLaughlin & Burr, 88 Tremont Street, Boston, are the architects.

Conveying apparatus is required for a four-story bindery plant, 10,900 sq. ft. to each floor, to be erected by the Riverside Press, Blackstone Street, Cambridge, Mass., bids for which are being asked by Monks & Johnson, 99 Chauncy Street, Boston, engineers.

Preliminary steps have been taken by the Kobert Machinery Co., Worcester, Mass., electric riveting machinery, to erect a plant on Sanborn Street, Gardner, Mass. James A. Redemann is treasurer. Willard S. Sims, treasurer L. S. Starrett Co., Athol, Mass., is a director of the company.

The Providence Gas Co., Providence, R. I., is having plans drawn for a mechanical and service works to include a meter shop, machine shop, fitters' shop, automobile service shop, and other departments. Jenks & Ballou, Providence, are architects. Bids will be asked early in April.

The Amedie Prouvost Co., Roubaix, France, care of Lockwood, Greene & Co., 24 Federal Street, Boston, architects and engineers, plans the construction of a power house at its proposed American branch wool-combing plant at Branch Village, North Smithfield, R. I., estimated to cost \$1,000,000.

The Beverly Coal Co., Beverly, Mass., has commenced the erection of a new coaling plant to include the installation of elevators, conveyors, etc., estimated to cost \$23,000. George P. Carver, 261 Franklin Street, Boston, is architect.

The Hygienic Ice Co., 881 State Street, New Haven, Conn., plans the construction of a two-story addition to its plant, estimated to cost \$110,000 including equipment.

The E. H. Clapp Rubber Co., Hanover Four Corners, Hanover, Mass., has plans for the immediate rebuilding of the portion of its plant recently destroyed by fire with loss of \$200,000 including equipment. In the meantime the company will develop considerable increased capacity at the plant of its subsidiary, the New Jersey Rubber Co., Lambertville, N. J. Headquarters are at 49 Federal Street, Boston.

Manual training equipment will be installed in the two-story and basement junior high school to be erected at Berlin, N. H., estimated to cost \$250,000, for which bids have been asked on a general contract. The Thomas M. James Co., 3 Park Street, Boston, is architect.

The Atlantic Carton Co., Norwich, Conn., manufacturer of paper cartons, containers, etc., has acquired several buildings, with power house, formerly held by the Shetucket Co., and will remodel the structures for a new plant.

The Boston Elevated Railway Co., Boston, estimates its immediate requirements for buildings and equipment at \$24,500,000. Of this amount, \$4,500,000 will be used for the completion of the new shops at Everett, including additional equipment; \$4,000,000, for the modernizing of car houses, surface repair shops and track layouts; \$3,000,000, for the completion of the power house at South Boston, including boilers, cables, switches, underground conduits and power substation additions; \$10,000,000, for new steel cars, and \$3,000,000, for miscellaneous machinery, buses, automobile service works, storage houses, etc. James F. Jackson is chairman of the board of trustees.

Detroit

DETROIT, March 3.

WORK will commence on a one-story ice-manufacturing plant by the Pittman & Dean Co., Hastings and Trombley Avenues, Detroit, to be 100 x 250 ft., estimated to cost \$200,000 with equipment. George B. Bright & Co., Marquette Building, are engineers.

The Angle Steel Tool Co., Otsego, Mich., has plans for an addition, 60 x 80 ft. C. E. Pipp is president.

The Holland Furnace Co., Holland, Mich., is reported to be considering the erection of an Eastern branch plant in the vicinity of Harrisburg, Pa.

The Hayes Wheel Co., Jackson, Mich., is completing negotiations for the purchase of the Hayes Truck Wheel Co., St. Johns, Mich.; Albion Bolt Co., Albion, Mich., and the Morrison Metal Stamping Co., Jackson. The two last noted companies have been furnishing parts for wheel production to the purchasing company for some time past. The Hayes company is arranging for a preferred stock issue of \$2,000,000, of which about \$1,850,000 will be used for the acquisition of the plants and businesses. C. B. Hayes is president.

The General Lumber Co., Milwaukee, has acquired the mill of the Rubicon Lumber Co., Alston, Mich., with large tract of timber property in this district. The new owner plans to enlarge the present saw mill and install additional machinery and power equipment. It is also proposed to construct a planing and shingle mill to cost \$80,000 with equipment. E. M. Hannures will be manager.

The Ford Motor Co., Highland Park, Detroit, is reported to have plans under consideration for the construction of a hydroelectric generating plant on property on the Huron River, near Ypsilanti, Mich., recently acquired.

Manual training equipment will be installed in the two-story and basement high school to be erected at Bad Axe, Mich., estimated to cost \$160,000, for which foundations will soon be laid. S. D. Butterworth, Prudden Building, Lansing, Mich., is architect.

The Consumers' Power Co., Jackson, Mich., is arranging a fund of about \$150,000 for extensions in its plant and system at Muskegon, Mich., and the installation of additional equipment. William M. Lewis is district manager.

Power equipment, control devices, conveying and other machinery will be installed in the proposed six-story printing plant to be erected by the Detroit Free Press, Free Press Building, Detroit, to be 130 x 210 ft., estimated to cost \$650,000. Albert Kahn, Marquette Building, is architect.

The Gotfredson Truck Corporation, Detroit, has acquired the plant of the Harroun Motors Corporation, Wayne, Mich., consisting of two main units totaling 225,000 sq. ft., and will use the property for expansion.

The United Steel & Wire Co., Battle Creek, Mich., has purchased the plant of the Railway Specialty Co., Atchison, Kan., at a receiver's sale. The Battle Creek company plans to proceed at once with the installation of machinery for the manufacture of pressed steel and wire goods.

The Excello Piston Ring Co., Detroit, recently incorporated with \$20,000 capital stock, will manufacture pistons, piston rings, rims, bushings, etc. Ground has been bought and the company will build a plant unless it is found advantageous to work by contract. Lathes, grinders and like equipment are required. George B. Townsend is president and John F. Watt, 13925 Grand River Avenue, secretary-treasurer.

Cincinnati

CINCINNATI, March 3.

A SLIGHTLY increased volume of business is reported by machine-tool manufacturers, but orders are still disappointing compared with outstanding inquiries. There are, however, some indications of greater buying interest during the month. Railroads and equipment companies will probably be large purchasers of machine tools, and business from automobile manufacturers is also expected to greatly improve. Indications of business from the latter source were seen in the number of orders booked by a local manufacturer last week. Old inquiries are also being revived, and will undoubtedly develop into orders.

The Standard Sanitary Mfg. Co. is said to have commenced buying for its Baltimore requirements and is expected to issue a list for Louisville shortly. The Canadian National Railways will probably purchase considerable machine tool equipment and have also issued a list for the Grand Trunk shops at Battle Creek, Mich. The Big Four Railroad is buying against its recent list, and action by the Santa Fe and Southern railroads is expected shortly. Used machinery dealers report orders fairly numerous.

The plant and equipment of the Athens Foundry & Machine Co., Athens, Ohio, sold a month ago to E. E. Jacobs, has again been sold to D. L. Wallace, coal operator, of Nelsonville, Ohio. Mr. Wallace plans extensions and improvements, and in addition to conducting a general foundry and machine shop business will manufacture mine cars and coal mining machinery and equipment.

The Eagle Battery & Supply Co., Dayton, Ohio, manufacturer of storage batteries, has been incorporated with a capitalization of \$40,000. The company has been operating as a partnership and contemplates adding considerably to its manufacturing facilities, although definite plans have not been completed. H. F. Pence, 209 North Main Street, is the principal incorporator.

The Heller-Aller Co., Napoleon, Ohio, manufacturer of windmills and tanks, has completed additions to its foundry which will enable it to increase its capacity 50 per cent. The working force has been enlarged to take care of the demand for a new type of windmill. The company is also manufacturing a new line of pumps for deep well work. O. P. Tietjens is general manager.

The C. C. Blackmore Co., Dayton, manufacturer of automobile accessories, has purchased the former plant of the Bahman Iron Works, and the Dayton Toy & Specialty Co., subsidiary of the Blackmore Co., will continue to occupy the building. The latter company is planning increasing its equipment for the production of new lines of accessories.

The Louisville Gas & Electric Co., Louisville, Ky., will erect an addition to its boiler room to cost \$100,000. New equipment, part of which has been purchased, will be installed.

The Columbus Bolt Works, Columbus, Ohio, has plans for an addition costing \$200,000. Bids will be asked in the near future. J. R. Poste is president.

The Stephenson Co., Hamilton, Ohio, coal and ice dealer, has plans for the erection of an ice manufacturing plant, 50 x 100 ft. and will need equipment.

Coal handling, transmission, conveying and other equipment will be installed by the Banner Fork Coal Co., Wallins Creek, Ky., in connection with improvements to mining properties, estimated to cost \$250,000.

General contract for the construction of an ice manufacturing and cold storage plant by the McKenzie Ice Co., McKenzie, Tenn., has been awarded to Eugene Frazier, McKenzie. Oil engines will be purchased to operate the machinery.

The Tennessee Electric Power Co., Chattanooga, Tenn., is disposing of a bond issue of \$3,000,000, a portion of the proceeds to be used for extensions.

The Carter County Clay Co., Grant Thornburg, president, Kitchen Building, Ashland, Ky., recently formed with a capital of \$300,000, is planning for the construction of a new plant in the Mount Savage section, for the manufacture of face brick and kindred products, estimated to cost \$225,000 with machinery. It is proposed to build a power house.

The Columbia Gas & Electric Co., Cincinnati, will hold a meeting of stockholders at Charleston, W. Va., April 8, for approval of a preferred stock issue of \$25,000,000, a portion of the proceeds to be used for the construction of the proposed generating plant at Fort Miami, vicinity of Cincinnati. It has acquired four utilities heretofore operated by the Pure Oil Co., Columbus, Ohio, and development program is being arranged, to include the installation of considerable machinery. P. G. Gossler, 62 Cedar Street, New York, is president.

The John H. McGowan Co., 54-58 Central Avenue, Cincinnati, manufacturer of pumping machinery, etc., has perfected plans for the removal of the plant of the Twinvolute Pump & Mfg. Co., 216 High Street, Newark, N. J., recently purchased, to the Cincinnati works, which will be improved to accommodate the additional machinery. It is understood that the Newark works will be discontinued. The purchasing company will continue the manufacture of the Twinvolute line.

The Louisville Gas & Electric Co., West Chestnut Street, Louisville, has plans for a three-story and basement service and mechanical works, 175 x 175 ft., to cost approximately \$250,000 with equipment. Bids will soon be asked. The Byllesby Engineering & Management Corporation, 208 South La Salle Street, Chicago, is engineer.

The Ohio Valley Pulley Works, Inc., Maysville, Ky., is inquiring for several Toledo inclinable open-back punch presses, Nos. 3½, 2, 2½ geared, or presses of similar construction and sizes.

The City Council, Ashland, Ohio, is planning the construction of a 75,000,000-gal. reservoir, for which pumping and other equipment will be needed. Albert H. Kennel is superintendent of water works.

Electrical and other equipment will be required by the Columbia Water & Light Co., Columbia, Tenn., in connection with improvements to be made in lighting system.

Cleveland

CLEVELAND, March 3.

THE Studebaker Corporation is buying machine-tool equipment in considerable volume for both its Detroit and South Bend, Ind. plants. During the week it purchased a round lot of machinery for production purposes and has considerable other machine tool equipment under negotiation. Aside from the Studebaker business the market is dull. Dealers are getting a scattering volume of orders, mostly for single machines, and a large part of this business is in used machinery.

The Cleveland Wire Cloth & Mfg. Co., 3573 East Seventy-eighth Street, Cleveland, will shortly begin the erection of a two-story and basement addition to be built at an estimated cost of \$20,000.

The Sanymetal Products Co., 6233 St. Clair Avenue, Cleveland, manufacturer of metal partitions, contemplates the erection of a one-story factory providing 10,000 sq. ft. of floor space.

The New York, Chicago & St. Louis Railroad, (Nickel Plate) Columbia Building, Cleveland, has plans under way for the construction of a one story, 52 x 190 ft. machine shop at Conneaut, Ohio, for which considerable equipment will be purchased. A new concrete coaling dock will also be erected.

The Warnke Brothers, Toledo, Ohio, have awarded contract for a sheet metal working plant to be built at an estimated cost of \$15,000.

The Champion Hardware Co., Ashtabula, Ohio, manufacturer of hardware, are having plans prepared for an \$80,000, three-story and basement factory, 50 x 130 ft. Lockwood-Green & Co., Hanna Building, are the architects.

The Standard Sanitary Mfg. Co. has acquired a new warehouse site at Mayfield and Random Roads, Cleveland, and plans to erect a \$200,000 building.

Considerable electrically operated equipment, including grinders, boring machine, drill press, lathe, etc., will be installed in the new Ford and Lincoln service station now under construction for the Markad Motor Corporation, 13,316 Madison Avenue, Lakewood, Ohio.

The Akron Gear & Engineering Co., Akron, Ohio, will be in the market for new gear cutting machines at an early date.

The High Street Garage, Barberton, Ohio, is reported to be in the market for considerable new garage and machine shop equipment.

Pittsburgh

PITTSBURGH, March 3.

REPORTS as to machine tool business vary, but it is still the general opinion that inquiries are more numerous than sales. The Westinghouse Electric & Mfg. Co., which recently closed for the steel for extensions to its transformer plant at Sharon, Pa., is reported to have closed against some of the tools, but action on the requirements for the new Gary plant of the National Tube Co., as well as for those for the Baltimore plant of the Standard Sanitary Mfg. Co. still is deferred.

In the heavier lines, the Bethlehem Steel Co. recently closed for mill drives and pinions for its Bethlehem and Sparrows Point plants and other steel companies, notably the Jones & Laughlin Steel Corporation, have extensive new construction plans on paper. The latter is giving much consideration to a new bar mill for rolling the smaller sizes. This unit originally was planned for its Southside plant in Pittsburgh, but there is now a possibility that it will be built at the Aliquippa works. A large number of cranes is involved in steel company programs. Recent local crane awards have been few, but a busy year is ahead if those which have been figured against are distributed.

The Frick Co., Waynesboro, Pa., is in the market for a modern 3-in. heavy duty Ajax upsetting forging machine and also a model CC Roovers high embossing press.

The Standard Plate Glass Corporation, Butler, Pa., recently formed by a merger of the Standard Plate Glass Co., with local plant, and the Heidenkamp Plate Glass Co., Springdale, Pa., is disposing of a preferred stock issue of \$1,080,000, a portion of the proceeds to be used in connection with the consolidation and for extensions and improvements.

The Westinghouse Air Brake Co., Westinghouse Building, Pittsburgh, has awarded contract to Stone & Webster, Inc., 147 Milk Street, Boston, for the erection of its proposed foundry and machine shop addition at Wilmerding, Pa., each three-story, 57 x 465 ft. and 80 x 450 ft. respectively, to cost \$1,000,000 with machinery. Bernard H. Prack, Keystone Building, is engineer.

The Board of Education, Pittsburgh, has filed plans for a one-story factory and mechanical building at 903 Lincoln Avenue for general operating service.

The Service Garage Co., Sistersville, W. Va., recently organized, has plans nearing completion for a two-story service and repair building, 60 x 120 ft., to cost \$50,000 with equipment. G. W. Thomas is president.

The Sullivan Pocahontas Coal Co., care of Price, Smith & Spilman, Charleston, W. Va., attorneys, recently formed to consolidate a number of interests in the Pocahontas-New River coal fields, W. Va., is disposing of a bond issue of \$1,200,000, a large portion of the proceeds to be used for the purchase of equipment and improvements. J. C. Sullivan is president.

The National Window Glass Mfg. Co., Huntington, W. Va., has been organized to take over and expand the plant of the Camp Glass Co., which has been idle for a number of months. The works have been leased, with option to purchase, and will arrange facilities for the employment of about 300 operatives.

The Chesapeake & Ohio Railroad Co., Richmond, Va., is perfecting plans for the construction of car and locomotive repair shops at Huntington, W. Va., to cost \$2,000,000 with equipment.

The N. P. Nelson Iron Works, Bessemer Building, Pittsburgh, manufacturer of conveying machinery, etc., is planning to purchase a steam pump and air compressor.

Chicago

CHICAGO, March 3.

THE Santa Fe has issued inquiries for 10 additional machines, bringing the total number of items on its pending list up to 125. Steel companies in this district are again taking an interest in the market. The Inland Steel Co. is inquiring for a 36 x 36-in. x 8-ft. planer, a 30-in. x 25-ft. engine lathe, a 60-in. boring mill, as well as cranes and special equipment. The Illinois Steel Co. is also inquiring for a few tools. A local machine tool dealer has booked an order for a 60-in. boring mill for delivery in the Northwest. Buying by industrial companies is gradually gathering momentum, although most current orders are for individual tools.

Inquiries from the National Plate Glass Co. and Wilson & Co. are still pending, and the latest news regarding the A. O. Smith Corporation list is that action on it will not be taken until April or May. Although vacillation still characterizes the attitude of some prospective buyers who repeatedly postpone action on their inquiries, machine tool sales in this territory during February exceeded those for January.

Additions to Santa Fe List

One 24-in. Dill, or equivalent, heavy duty motor-driven crank slotter.

One 20-in. Barnes, or equivalent, upright belt-driven drill press.

One 20-in. Barnes, or equivalent, motor-driven upright sensitive drill press.

One 24-in. Barnes, or equivalent, motor-driven upright sensitive drill press.

One Putnam, or equivalent, heavy-duty type motor-driven double end car axle lathe.

One Style 60 Heald, or equivalent, motor-driven grinding machine.

One 24-in. x 12-ft. American, or equivalent, belt-driven engine lathe.

One 30-in. x 12-ft. Lodge & Shipley, or equivalent, motor-driven selective head engine lathe.

One 36-in. x 16-ft. Boye & Emmes, or equivalent, motor-driven heavy duty type engine lathe.

One large punch and shear.

The Whiting Corporation, Harvey, Ill., has booked the following orders for foundry equipment: One No. 9½ cupola for the Standard Sanitary Mfg. Co. at New Brighton, Pa.; one No. 3½ cupola for the Winslow Standard Scale Works, Terre Haute, Ind.; one No. 9 cupola, two cupola-charging machines and 33 charging cars for the Sanitary Co. of America, Linfield, Pa.

The Republic Flow Meters Co., 2240 West Diversey Avenue, Chicago, has awarded contract for a two-story addition, 75 x 125 ft., to cost \$50,000.

The Western Valve Bag Co., 360 East Grand Avenue, Chicago, has awarded contract for a one-story machine shop, 100 x 123 ft., at 2600 Irving Park Boulevard, to cost \$40,000.

The Lamb Bottling Works, 624 South Paulina Street, Chicago, will take bids through Dublin & Eisenberg, 14 West Washington Street, on a two-story and basement factory, 50 x 100 ft., at 629-31 South Paulina Street, to cost \$25,000.

L. E. Russell, 25 North Dearborn Street, Chicago, has prepared plans for a one-story steel treating plant, 67 x 125 ft., with crane, 2139-43 Walnut Street, for Holton-Seelye & Co., 140 South Dearborn Street, who will receive bids. The building, which will cost \$30,000, will be occupied by the Western Rust Proof Co., 1040 West Lake Street.

Ninety acres of land have been purchased at North Judson, Ind., as a site for a plant to be erected for the North Judson Car & Equipment Co., financed by Chicago and Indiana men. Albert M. Oliver, Oak Park, Ill., is president and general manager. The plant, which will be started at once, will be utilized for the repair and construction of box cars, and approximately 400 men will be employed.

The Foote Gear Works, Inc., recently organized, will start operations in a plant at 430 North Oakley Boulevard,

Chicago, March 7. Bradford Foote, who is president and treasurer, resigned as officer, director and general manager, and sold his entire interests in the Foote Brothers Gear & Machine Co., Chicago, last September. Since that time he has purchased the entire equipment, good will and trade name of the Crofoot Gear Works, Boston, and has moved the machinery to the North Oakley Boulevard plant, which is now equipped with over 200 gear making machines. At present the company is in the market for a used Gleason bevel gear planer, 24-in. or 36-in., and a 36-in. Gould & Eberhardt hobbing machine.

The Commonwealth Edison Co., Chicago, recently purchased a tract on the shore of Lake Michigan, Hammond, Ind., and is reported to be preparing to improve it with a large electric power plant.

Damage from a recent fire at the Decatur, Ill., shops of the Wabash Railroad is estimated at \$250,000.

The Wabash Railroad plans to double its machine shops at Moulton, Iowa.

The Winslow Boiler & Mfg. Co. contemplates building an addition to its plant at Galesburg, Ill.

The Peerless Level & Tool Co., Rock Falls, Ill., manufacturer of aluminum and wood carpenters' and masons' levels, will erect a one-story brick plant, 100 x 145 ft., at Sterling, Ill., across the Rock River from its present location.

The Universal Crusher Co., 225 North Third Street, East, Cedar Rapids, Iowa, manufacturer of stone crushing machinery, etc., will soon take bids for a one-story and basement addition, 60 x 138 ft., to cost \$30,000. Norman Hatton, Cedar Rapids, is architect. W. L. Harrison is president.

The Dubuque Electric Co., Dubuque, Iowa, is disposing of a bond issue of \$1,000,000, a portion of the proceeds to be used for extensions and the installation of additional equipment.

The Atlantic Wire & Iron Co., 1638 Fulton Street, Chicago, is taking bids for a three-story addition, including improvements in the present work, estimated to cost \$35,000. Henry Apfelbach, 952 North Michigan Avenue, is architect. David Worchore is general manager.

The Citizens' Waterworks, Inc., Litchfield, Ill., will take bids until March 26 for additional equipment, including two 200-hp. fire tube boilers; two boiler-feed pumps; three steam-driven centrifugal pumps, and auxiliary equipment. Pearce, Greeley & Hansen, 39 West Adams Street, Chicago, are engineers.

The Sioux City Gas & Electric Co., Sioux City, Iowa, is disposing of a bond issue of \$2,500,000, the proceeds to be used in connection with a new steam-operated electric generating plant on the Big Sioux River, between Janet and Florence Streets, with initial installation of 22,000 kw. L. L. Kellogg is president.

The Universal Advertising Co., Hibbing, Minn., manufacturer of electric displays, etc., is planning for the installation of punches, dies, shears and kindred tools for sheet metal handling.

The Acme Steel Goods Co., 2834 Archer Avenue, Chicago, has plans for a one-story addition at the rear of its present factory, estimated to cost \$15,000. The George C. Nimmons Co., 122 South Michigan Avenue, is architect and engineer.

The Common Council, Piquah, Iowa, has arranged for a bond issue for the construction of the proposed municipal electric plant, for which plans will soon be prepared. A. J. Smith is mayor.

The Chicago Metal Mfg. Co., 3711 South Ashland Avenue, Chicago, is in the market for a 24-in. vertical boring mill.

Milwaukee

MILWAUKEE, March 3.

SCATTERING sales of machine tools are reported by local dealers, while manufacturers of equipment are meeting with a moderate call, usually for single items. Inquiry the last half of February was more active than at any time since Jan. 1, and an improved March trade is expected by all interests. General industrial demand is increasing slowly. Foundries and machine shops are making small additions to working forces from week to week under better orders; in fact, the metal trades show the largest percentage of increase in number employed during the past month. Dealers find sales of used equipment relatively good, especially among new industries being established on a modest scale.

The Crown Machine Co., Milwaukee, has been incorporated with a capital stock of \$10,000 to take over the business of A. R. Buchholz, 960 Fortieth Street, manufacturer

of mechanical appliances, plated parts, etc. Inquiry is being made for a small list of additional equipment, including lathes, drill press, shaper and stamping press. O. A. Wandrey and W. F. Krell are interested in the business.

The Mitchell Motor Car Co. of Racine, Wis., a new \$250,000 corporation which has acquired patent rights, designs, and a round lot of the equipment of the bankrupt Mitchell Motors Co., Inc., has leased a factory in Lake Avenue, near Fourth Street, and is establishing a new plant, to be opened about March 24. The manufacture of Mitchell passenger cars will be resumed on a limited scale, material for 500 cars having been contracted for. Production of replacement and repair parts for all models of the Mitchell car will for the time being represent the major endeavor. W. L. Clunie is service manager in charge of production.

The City Water Commission, Neenah, Wis., has been authorized by the Common Council to expend \$30,000 for the purchase of additional equipment for the water supply system, and bids will be taken immediately. Items include one 200-hp. oil engine, with a 170-kva. generator; one 750-cu. ft. two-stage air compressor and one 125-hp. slip ring motor with starter; air lift pump; one 15,000-gal. fuel oil reservoir and a 42-in. x 120-in. receiver tank. The purchase was delayed by consideration of a proposition to extend the present contract for electrical energy from central station, which will be abandoned. Harry S. Zemlock is secretary of the commission, and C. A. Chapman, Chicago, is consulting engineer.

The Red Star Yeast & Products Co., 79 Buffalo Street, Milwaukee, is in the market for a 20-ton artificial ice machine for an extension of its Milwaukee plant. It also will start work April 1 on the erection of a branch warehouse and distributing station in Kansas City, Mo., to cost about \$50,000, and be the first of a series of branch houses. These will be of uniform design and equipment, and require ice and refrigerating machinery, conveyors, etc. Eugene R. Liebert, 432 Broadway, Milwaukee, is architect and engineer.

The Board of Industrial Education, Burlington, Wis., is asking bids until March 19 for the construction of a new senior vocational high school, 184 x 245 ft., two stories and part basement, designed by Oppenheimer & Obel, architects, Green Bay and Wausau, Wis. The cost is estimated at \$300,000. It is not likely that equipment needs will be formulated before midsummer, as the school will not be ready for students until late in the year. F. L. Witter is city superintendent of schools.

The Accessories Production Co., La Crosse, Wis., has been incorporated with \$50,000 capital stock to manufacture a general line of automotive equipment, parts and accessories, hardware specialties, etc. The principals are Jack Holley, E. A. Morgan and H. H. Robinson.

The city of Tomah, Wis., has engaged W. G. Kirchhoffer, consulting engineer, Madison, Wis., to make plans for an extension of the water supply, with a new 12-in. deep well requiring a 300-gal. per min. centrifugal pump, engine and motor-driven; a pump house, 18 x 20 ft., and an 80,000-gal. steel tank mounted on a 100-ft. steel tower. Bids on equipment probably will be taken late in March. F. O. Drow is superintendent waterworks department.

The Valley Iron Works Co., Appleton, Wis., has increased its capitalization from \$400,000 to \$550,000, and will begin work soon on extensions of its foundry and machine shop, fabricating shop and other facilities. The concern specializes in the production of paper mill machinery and equipment. E. A. Peterson is treasurer and general manager.

The Appleton, Wis., Board of Public Works let contracts on revised plans for two junior high and vocational schools of similar design, for the East and West divisions, the former to the Hoeppner & Bartlett Co., Eau Claire, and the latter to J. C. Nelson & Son, 5044 Thirty-sixth Avenue South, Minneapolis, Minn. Each will cost about \$185,000, not including equipment. The architects are Perkins, Fellows & Hamilton, 814 Tower Court, Chicago.

Indiana

INDIANAPOLIS, March 3.

PLANS are being completed for a municipal automobile service and repair building at New York and Alabama Avenues, Indianapolis, 70 x 105 ft. and 200 x 200 ft., estimated to cost \$180,000. The Board of Public Works is in charge. F. B. Hunter, 912 State Life Building, is architect.

The Emerson-Scheuring Tank Co., Indianapolis, recently organized, will occupy a portion of the plant of the Burpee-Johnson Co., Singleton Street and the Belt Railroad, manufacturer of shock absorbers, etc., totaling about 6000 sq. ft. The new company will manufacture oil storage tanks and other arc-welded steel plate specialties, with initial equipment installation estimated at \$12,000. The company expects

to occupy its own plant later. W. J. Emerson is president, and C. E. Scheuring, vice-president and general manager.

The Thompson Body Works, Indianapolis, has arranged for the establishment of a plant at 907 North Capitol Avenue, recently leased, for the manufacture of automobile bodies.

Fire, Feb. 23, destroyed a large portion of the flour milling plant of the Kelsay-Burns Milling Co., Evansville, Ind., with loss estimated at \$500,000, including power equipment, elevating machinery, etc. Plans for rebuilding are under consideration. The company was known previously as the Akin-Erskine Milling Co.

The Standard Oil Co., 501 North Madison Avenue, Bloomington, Ind., will build an automobile service and repair works at its local property for company trucks and cars. It will be two stories and basement, 150 x 200 ft., a portion to be used for general warehouse service.

The Southern Railway Co., Southern Railway Building, Cincinnati, has awarded a general contract to the W. Toelle Co., Princeton, Ind., for its one-story planing mill at Princeton, 85 x 245 ft., estimated to cost \$70,000 with machinery. Adam Potter is engineer for the railroad.

The Indiana Electric Supply Co., Capitol Avenue and Washington Street, Indianapolis, has leased the three-story building at 120 South Pennsylvania Street and will remove to this location.

The Stieglmeyer Mfg. Co., Seymour, Ind., which controls the Automatic Train Control Co., has purchased the controlling interest in the Simplex Train Control Co., Rochester, N. Y. It is planned to combine the best features of the Simplex and Stieglmeyer devices and to confine manufacturing to the Seymour plant. Edward Stieglmeyer, Odd Fellows Building, Indianapolis, is general manager of the Stieglmeyer Mfg. Co.

Horizontal boilers and auxiliary equipment will be required for the new municipal greenhouse to be erected at South Bend, Ind., estimated to cost \$50,000 and for which Otis Romine, president of the Park Board, is in charge.

Vocational and manual training equipment will be installed in the school to be erected at Lydick, Ind., to cost \$75,000 and for which the general contract has been awarded to G. E. Miller, Goshen, Ind.

Contract has been awarded to the Kenwood Bridge Co. for the construction of three new buildings estimated to cost \$75,000 for the American Steel Foundries, East Chicago, Ind. Some new equipment will be purchased.

South Atlantic States

BALTIMORE, March 1.

MANUAL training equipment will be installed in the new junior high school to be erected in the Gwynns Falls Park section, Baltimore, estimated to cost \$500,000, for which bids will be received on a general contract until March 19. The Public Improvement Commission, Steuart Purcell, chief engineer, is in charge.

The Anthracite Fuel Corporation, Baltimore, has construction in progress on its plant at Fair Avenue and Eighth Street, for the manufacture of fuel briquettes, to include a steam power house, automobile service and repair building, oven and press departments and other structures.

The Common Council, Durham, N. C., City Manager Rigsby in charge, is perfecting plans for the construction of a municipal hydroelectric generating plant to cost approximately \$100,000 with machinery.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until March 18 for a quantity of bolts, nuts and rivets for Eastern and Western navy yards, schedule 1925; until March 25 for 2000 lb. of copper pipe and 2000 lb. copper tubing for the Portsmouth, N. H., navy yard; 14,000 lb. brass pipe for the Mare Island yard, and 5900 lb. copper tubing for the Puget Sound yard, schedule 1946, and 25,105 ft. welded steel pipe for the Mare Island yard, schedule 1945.

The Bristol Coal & Ice Co., Bristol, Va., has tentative plans for the construction of a cold storage plant as well as coal tipples. Work is in progress on an ice-manufacturing plant. R. F. Wagner is president.

The Proximity Mfg. Co., Greensboro, N. C., is planning for improvements in the power house at its local textile mill, including the installation of additional boilers, stokers, coal-handling machinery and auxiliary equipment.

Fire, Feb. 25, destroyed the barrel-manufacturing plant of T. W. Wyford, Chincoteague, Va., with loss estimated at \$65,000 including equipment. Plans are under consideration for rebuilding.

The Mallory Machinery Corporation, 522 Light Street, Baltimore, machinery dealer, has inquiries out for a two or

three-drum steam hoist, with boiler, swinger, etc.; also for a similar hoist, motor driven, 25 to 50 hp. motors.

The Board of Aldermen, Rocky Mount, N. C., will receive bids until March 26 for equipment for a municipal electric power plant, including one 2500 kw. turbo-alternator, with direct-connected exciter; one surface condenser for 2500 kw. turbine, with duplicate dry vacuum pumps, hot well motor-driven centrifugal pump, etc.; one motor-driven centrifugal circulating pump; one turbine-driven centrifugal circulating pump; one 40 kw. direct-connected turbine-driven exciter; one switchboard with one generator panel, two exciter panels and two feeder panels; two 750 hp. watertube boilers, with alternate bid on three such units; two superheaters for boilers, with alternate bid on three; one steel plate smoke flue; one steel plate boiler blow-off tank; two sets of soot blowers, and alternate bid on three sets; two sets of feed water regulators, and alternate bid on three sets; two, and alternate bid on three, underfeed mechanical stokers, with turbine-driven blowers, shafting, one motor and one engine stoker drive, with pulleys, chains, etc., for 750 hp. boilers; one 3000 hp. open type feed water heater; two boiler feed pumps, one turbine-driven and one direct acting; one radial brick stack, 225 ft. high; one 30-ton traveling crane for turbine room, 30 ft. span, with motor hoist, rails, track girders, etc., as per plans and specifications on file. William C. Olson, Raleigh, N. C., is consulting engineer. C. H. Harris is city clerk.

The Gastonia Brick Co., Gastonia, N. C., recently organized, is planning the construction of a plant on about 20 acres for an initial output of 30,000 brick per day. A power house will be constructed. The company plans the early purchase of a steam shovel. John L. Curran is secretary.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a company at Valparaiso, Chile, in the market for acetylene welding equipment and industrial oxygen machinery, reference No. 9257; a company at Mazatlan, Mexico, desirous of purchasing a 10 to 16 hp. marine engine, low speed, gasoline or distillate operation, reference No. 9249; a concern at Burgas, Bulgaria, in the market for machinery for the manufacture of lead pencils, reference No. 9255; a company at Delhi, India, desirous of getting in touch with American manufacturers of engine lathes, planers, drills, power hammers and other machine tools, reference No. 9285; a company at Winnipeg, Canada, in the market for oil-burning equipment for an up-draft brick kiln, and for machinery for removing stones, etc., from wet clay, reference No. 9230; a company at Cork, Ireland, desirous of purchasing agricultural implements, reference No. 9220; and another company at Cork in the market for wire nails, sheeting nails with galvanized washers, etc., reference No. 9252.

The Board of Works, Bamberg, S. C., is planning for extensions in the municipal electric plant, to include the installation of two 150 hp. engine-generator sets, oil-operated, with 125 kva. generator and auxiliary equipment. L. P. Tobin is superintendent.

The William Schluderberg-T. J. Kurlie Co., Baltimore and Fifth Streets, Baltimore, meat packer, plans for the installation of an ice and cold storage department in its proposed addition, estimated to cost \$400,000 with equipment. C. B. Comstock, 110 West Fortieth Street, New York, is engineer. W. T. Schluderberg is president.

The Mallory Machinery Corporation, Baltimore, is inquiring for two drum and swinger or three drum skeleton steam hoists or with A. S. M. E. boilers, and also two drum and swinger or three drum electric hoists, 25 to 50 hp. motors.

In THE IRON AGE of Jan. 24, page 349, it was stated that the Planters Nut & Chocolate Co., Suffolk, Va., would build a power house at its proposed local factory and would also establish a plant for the production of paper boxes, containers, etc. The company writes that this item was incorrect, as the building of the power house was completed about 30 days ago and the company does not contemplate the construction of any additional buildings in the near future.

Pacific Coast

SAN FRANCISCO, Feb. 27.

ABOUT 90 acres at Monrovia, Cal., has been acquired by the Colby Management Co., Monrovia, for a new plant to manufacture tractors and parts. The initial unit will be 90 x 1600 ft. It is proposed to remove an existing foundry at Huntington Park, Cal., to the new location. The plant will cost in excess of \$250,000, with machinery. J. M. Kroyer, head of the Kroyer Motors Co., Los Angeles, is interested in the company.

The Atchison, Topeka & Santa Fe Railway Co., Kerkhoff Building, Los Angeles, will commence the erection of the first unit of new machine shops at San Bernardino, Cal., to

cost about \$250,000. Contract for foundations and engine pits has been awarded to the Joseph E. Nelson & Sons Co., 3240 South Michigan Avenue, Chicago.

The Western Furniture Mfg. Co., 5955 South Western Avenue, Los Angeles, has filed plans for a new one-story plant, 60 x 400 ft., to cost \$65,000, for which a general contract has been awarded to the Ralph E. Homann Co., 3720 South Park Avenue.

The Uniform Mixed Concrete Co., Santa Ana, Cal., has commenced the construction of a new plant at Orange, Cal., and will expend about \$50,000 for mixing machinery, power equipment, etc. A. H. Britton and B. R. Ford are heads.

The Pacific Coast Steel Co., Rialto Building, San Francisco, plans the installation of pulverizing and classifying equipment for dolomite by-product manufacture at Hollister, Cal., estimated to cost \$25,000.

The Balboa Motors Corporation, Fullerton, Cal., care of George A. Raymer, secretary and general manager, local Chamber of Commerce, is closing negotiations for the purchase of a site for a new automobile assembling plant. The initial works will cost \$130,000 including machinery.

The Fisher-Gaffney Body Co., 555 Bryant Street, San Francisco, manufacturer of automobile bodies, is arranging for the erection of a new two-story plant, 110 x 150 ft., estimated to cost \$70,000.

The Safety Electric Products Corporation, 1330 East Sixteenth Street, Los Angeles, has plans for a one-story works, 95 x 250 ft., for the manufacture of electrical specialties, estimated to cost \$50,000. Frank L. Stiff, Pacific Finance Building, is architect.

The Union Ice Co., 354 Pine Street, San Francisco, is arranging for the erection of a new ice-manufacturing plant on site selected at Woodland, Cal., estimated to cost \$45,000. R. G. Bailey is in charge.

The Board of County Commissioners, Elko, Nev., has approved an appropriation for the installation of additional equipment in the electric power plant at Carlin, Nev., including a 150-hp. Diesel engine and auxiliary equipment.

F. A. Maginnis, Los Angeles, is having plans drawn by the Gay Engineering Corporation, 2650 Santa Fe Avenue, for a new ice-manufacturing plant, one-story, 110 x 117 ft., estimated to cost \$125,000, with machinery.

Gulf States

BIRMINGHAM, March 3.

A GENERAL building contract has been awarded by the Knox Process Corporation, Texas City, Tex., to the American Construction Co., Houston, Tex., for a six-unit gasoline refinery on 125 acres recently purchased. Orders will be placed for equipment in the near future. It is estimated to cost \$1,500,000 including machinery.

An agreement for interchange of power has been arranged by the Houston Power Co., Dothan, Ala.; the Pea River Power Co., Troy, Ala.; and the River Falls Power Co., Falls, Ala. Plans are under way for extensions and improvements to carry out the agreement, to include the installation of additional electric power and line equipment, estimated to cost \$100,000. The Southern Engineering Corporation, Albany, Ga., is engineer.

The Atlantic Ice & Coal Corporation, Montgomery, Ala., has plans for a new ice-manufacturing plant, estimated to cost \$45,000 including equipment. A. B. Pope is manager in charge.

The Western Electric Co., Hawthorne, Ill., has leased a two-story building to be erected at Wood and Austin Streets, Dallas, Tex., with foundations for two additional floors later, 100 x 100 ft., for a new factory branch and distributing work to cost about \$65,000. It will remove its present branch on Pacific Avenue to the new location. Lang & Witchell, Dallas, are architects.

The Central Foundry Co., Anniston, Ala., manufacturer of cast iron pipe, has commenced the rebuilding of the portion of its foundry recently destroyed by fire with loss of about \$100,000. A list of equipment will soon be arranged. E. P. Cooper is local manager.

The Calcium Arsenate & Lime Co., Waco, Tex., recently organized to take over properties in this vicinity, will soon break ground for a new plant to cost approximately \$160,000 with machinery. A site has been selected at Leon Junction. S. C. Williams is president.

The Dallas Service Stations, Inc., Dallas, Tex., has leased a three-story building, 125 x 228 ft., to be erected at Harwood Street and Pacific Avenue, for a new service and repair works. It will cost approximately \$100,000. C. D. Hill & Co., Dallas, are architects.

The Common Council, Mart, Tex., has arranged an appropriation of \$150,000, for extensions and improvements

to the municipal waterworks, to include a new pumping plant, with oil-engine driven, centrifugal pumping equipment and other machinery, pipe line, etc., for which bids will soon be asked by Koch & Fowler, Dallas, Tex., engineers and architects.

Frank M. Murchison, El Paso, Tex., has tentative plans for the organization of a company to construct and operate an electric light and power plant at Fabens, Tex., to cost about \$35,000. An ice-manufacturing plant is also projected.

The City Commission, Tampa, Fla., will receive bids until March 11, for mechanical equipment for the new municipal freight dock, including one locomotive crane, 15 to 20-ton capacity, and one magnet for handling steel; one locomotive, gasoline power; one conveyor or stacking machine; electric or gasoline-operated trucks, with trailers; about 50 hand trucks; one or more automatic platform scales, capacity from 1000 to 4000 lb. each. Specifications at the office of W. D. Hall, port engineer, P. O. Box 2736, Tampa.

The H. K. Ferguson Co., Cleveland, has been awarded contract for the erection of a \$1,000,000 plant for the Continental Cotton Gin Co., Birmingham. Construction will start at once on six buildings to provide a floor space of 117,000 sq. ft. Other buildings to follow later will give an additional floor space of 311,320 ft. New machinery and equipment will be purchased.

Canada

TORONTO, March 3.

THE demand for machine tools in February compares very favorably with that of the previous month. While large lists were absent, selling interests reported good sales in small lots. The automotive industry is a steady customer and from this source dealers and builders are closing a good volume of orders. Northern Ontario mining concerns have been in the market lately for mining machinery and a number of good orders have been booked. Woodworking machinery is moving freely.

C. S. Moyer, chairman of the Board of Works, Brantford, Ont., is receiving bids until March 13 for the supply and installation of two direct connected vertical centrifugal pumps, with motors and switchboard equipment, for the Bellview Sewage Pumping Station. Plans and specifications are with the city engineer.

Construction has started on the erection of a \$60,000 power plant and shipping pier at Ingonish, for the Ingonish Gypsum Co. S. A. Stephens, Canada Cement Building, Montreal, is manager. Machinery including oil engine, generator, motors, and conveyors will be purchased.

The Spanish Mills Co., Sudbury, Ont., propose to start work immediately on the construction of a mill at Wahnapitae Lake, Ont., to cost \$75,000.

The Harvester Co., Belview Avenue, Hamilton, Ont., will start work immediately on a \$15,000 addition to its plant.

The City Council, Grand Mere, Que., proposes to build a sewerage system and plant at a cost of \$400,000. H. Ortiz is engineer in charge.

Bids will be called shortly for the construction of an \$80,000 sewage disposal plant at Kettle Creek, St. Thomas, Ont. An electrically operated pumping station to furnish compressed air will be erected. W. C. Miller is engineer in charge.

The Eagle Star Machinery Co., Ottawa, Ont., is in the market for machinery for the manufacture of rechargeable storage batteries. E. Mayhew, Renfrew, Ont., is purchasing agent.

P. Metayer, Richmond, Que., is asking for prices on complete sawmill equipment.

The York Township Council, Grant R. Jack, township engineer, is having plans prepared for a sewage disposal plant and system to cost \$500,000. R. O. Wynne-Roberts, 88 Church Street, Toronto, is consulting engineer.

The Acton Machinery Co., Acton, Ont., has taken over the new factory of the Thompson Motor Supplies and will add its equipment to manufacture the products previously turned out by the two concerns.

Western Canada

A syndicate in which F. Jones, president of the Canada Cement Co., Montreal, and Angus McLean, a prominent Eastern lumberman, are interested propose to start work this year on the erection of a pulp and paper plant at Prince George, B. C., to cost \$10,000,000. It is stated that satisfactory arrangements regarding royalties have been fixed with the Provincial Government.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	44 3/4	46 1/4	Int. Har.	84 3/4	85 3/4
Allis-Chal. pf. ..	94	94	Int. Har. pf.	106	107 1/2
Am. B. S. & Fdy. 77 1/2	81		Lima Loco.	64 3/4	66 1/2
Am. B. S. & F. pf. 108 1/2	108 1/2		Midvale Steel ..	31 1/2	31 1/2
Am. Can.	110 3/4	115 1/2	Nat.-Acme	8	8 1/4
Am. Can pf.	112 3/4	112 3/4	Nat. En. & Sim. 30 1/4	32 1/4	
Am. Car & Fdy. 165	165		N. Y. Air Brake 39 1/4	40 3/4	
Am. C. & F. pf. 121 3/4	121 3/4		Nova Scotia Stil. 14 1/2	14 1/2	
Am. Locomotive. 73 1/2	75 3/4		Otis Steel	10 7/8	11 1/2
Am. Loco. pf.	119	119	Otis Steel pf.	70	74 1/2
Am. Radiator ..	99 1/2	101 1/4	Pressed Stl. Car 54	56 1/2	
Am. Steel Fdries. 37 1/2	38 1/2		Pressed Stl. pf. ..	87	87
Am. Stl. Fd. pf. 103 3/4	104		Replogle Steel ..	10 1/2	11
Bald. Loco.	120 3/4	124 1/4	Republic	55 1/2	57 1/2
Bald. Loco. pf. 115	115 1/2		Republic pf.	94	94 3/4
Beth. Steel	56 5/8	58 1/2	Sloss-Sheffield ..	62 1/2	65 5/8
Beth. Stl. 7% pf. 94	95 3/4		Steel of Canada. 76 1/2	77 1/2	
Beth. Stl. 8% pf. 107	110		Un. Alloy Steel. 33 1/2	34	
Chic. Pneu. Tool 82 3/4	84		U. S. Pipe.	64	74 3/4
Colo. Fuel	26	27	U. S. Pipe pf.	87 1/2	89
Crucible Steel ..	62 3/4	64 1/2	U. S. Steel.	101 3/8	104 7/8
Deere pf.	70	71	U. S. Steel pf.	119	119 3/4
Gen. Electric	202	211 1/2	Vanadium Steel. 29 3/4	31	
Gt. No. Ore Cert. 28 1/2	29		Whouse Air Br. 92 1/4	94 3/4	
Gulf States Steel 80 1/4	83 3/4		Y'gstown S. & T. 68	68 3/4	

American Locomotive Co. Report

The report of the American Locomotive Co. for 1923 reveals the effects of the large volume of railroad buying last year. Gross earnings totaled \$90,180,176, the largest in any year since the company's fiscal year was changed. After deducting preferred requirements there remained \$10,626,564 applicable to common stock at \$21.25 per share, on the 500,000 shares. Surplus for 1923 after all dividends amounted to \$8,126,564, from which \$4,500,000 was reserved for additions and betterments. Last year \$2,307,895 was expended for these items. Of the business obtained during the year, about 86 per cent was received in the first six months. Unfilled orders on hand Dec. 31, last, amounted to \$17,789,873, of which 2.7 per cent was foreign. The balance sheet showed excess of current assets over current liabilities of \$46,436,236. President Andrew Fletcher stated in his report that the results in developing steam locomotives of the three-cylinder type last year were "most gratifying."

Industrial Finance

Stockholders of the Hayes Wheel Co. will meet in special session on March 25 to decide upon the proposal to take over the property of the Hayes Truck Wheel Co. of St. John, Mich.; the Albion Bolt Co., Albion, Mich., and the Morrison Metal Stamping Co., Jackson, Mich. None of the companies has any mortgage or debenture debt, according to a statement by C. B. Hayes, president Hayes Wheel Co. It is proposed to finance the acquisition by an issue of 7 1/2 per cent cumulative preferred stock, amounting to approximately \$1,850,000.

The American LaFrance Fire Engine Co. reports net profits for 1923 of \$702,540, after all expenses and Federal taxes. This compares with \$736,944 in the preceding year. Surplus after allowing dividends on common and preferred stock, amounted to \$220,205 against \$257,870 in 1922. Unfilled orders on Jan. 1, last, were valued at \$1,400,000.

Net profits of the Timken Roller Bearing Co. for 1923 amounted to \$8,096,803, after all expenses and charges, compared with \$7,724,029 in 1922. Net profits were equivalent to \$6.74 per share earned on 1,200,000 shares of outstanding stock, against \$6.43 in the previous year. Balance sheet as of Dec. 31, 1923, showed current assets of \$15,418,095 and current liabilities of \$1,325,242.

Don C. McCord, who with Maurice L. Rothschild, acquired control of the Apperson Brothers Automobile Co., Kokomo, Ind., about a year ago, has announced that arrangements to finance this season's production have been completed and the plant will resume operations at once. At a meeting of creditors Nov. 1 the company agreed to manufacture 728 automobiles before Aug. 1, 1924.

The Thomson Spot Welder Co., 84 State Street, Boston, has reduced its capitalization from \$598,300 to \$250,000 by eliminating the outstanding preferred stock.

Annual report of the Standard Sanitary Mfg. Co., Pittsburgh, shows sales in 1923 of \$69,043,094 and net earnings of \$8,081,592. These figures compare with \$55,200,647 and \$7,010,447 for 1922. Surplus reached \$7,732,734 in 1923 against \$5,416,344 in the year previous.

Net income of the American Smelting & Refining Co. for 1923 totaled \$8,924,581, after all charges and taxes. After preferred dividend requirements, this was equivalent to \$8.89 per share on \$80,998,000 in outstanding common stock.

Net income for the preceding year was \$5,918,144, or \$3.28 per share earned on common stock.

Following bondholders meeting last week of the Bath Iron Works, Ltd., Bath, Me., a committee was appointed to formulate proceedings toward a foreclosure of the \$1,500,000 mortgage and to appoint a receiver. The last financial statement issued showed a deficit of \$740,061. In addition the Government has an outstanding claim for \$372,828 for income and war or excess taxes.

The report of the Canada Foundries & Forgings, Ltd., Brockville, Ont., showed a net surplus for last year's operations of \$71,651, business of \$1,280,000 and total losses of only \$400. "Business last year throughout Canada," it was stated in the report, "was inactive and profits below the average, due largely to keen competition from British and American sources."

The annual report of the Chicago Railway Equipment Co., Chicago, while giving no figures for earnings, indicates a net for 1923 of \$1,097,321 or the equivalent of \$3.45 a share on the common stock. Current assets are shown at \$4,085,694, compared with current liabilities of \$2,038,366.

The Interstate Iron & Steel Co., Chicago, shows net profits for 1923, of \$351,060, after deductions for interest, taxes and depreciation. This is equal to \$17.08 a share on the preferred stock, compared with a net of \$231,574 and \$11.24 a share on the preferred in the previous year.

Total earnings of the British Empire Steel Corporation, Montreal for the year ending Dec. 31, 1923, after deducting expenses, amounted to \$4,444,346, compared with \$6,917,275 in 1922, but the latter amount includes \$4,000,000 received in the settlement of claims against the Federal Government for cancellation of ship plate contracts. Net income of \$1,353,357 was shown after depreciation and charges as against \$1,612,570 in the previous year. Profit and loss surplus reached \$1,031,031. In addition to this surplus there is a surplus which remained at the date of organization amounting to \$21,784,870. Total assets at the end of 1923 amounted to \$158,209,355, a slight increase over 1922. President R. M. Wolvin explained in his remarks to shareholders that \$2,293,418 was put into capital expenditure during the year.

The annual report of the Sharon Steel Hoop Co. for 1923, indicates that the company had one of the best years in its history. At the end of 1922 its deficit amounted to \$3,291,340. This was reduced last year to \$1,560,071. Shipments in 1923 aggregated 282,015 tons of finished and semi-finished steel, having a total sales value of \$20,810,331. Net profits for the year were \$1,808,545, following deductions of \$785,409 for depreciation, \$462,821 for interest and discount on bonds and notes, and \$119,127 for loss on abandoned equipment.

The Wheeling Sanitary Mfg. Co., Wheeling, W. Va., has increased capital stock from \$750,000 to \$1,000,000. J. E. Wright, president, advises that the increase which will consist of 2500 shares of 10 per cent cumulative preferred stock of \$100 par value, will provide funds which will be used to some extent for plant betterments, to increase working capital and in refunding present indebtedness.

Sale of the Sizer Steel Corporation's Hammond plant was ordered delayed by Federal Judge Hazen on Feb. 22 pending a decision on claims of unsecured creditors that portions of the property were not covered by the \$1,250,000 mortgage held by the Fidelity Trust & Deposit Co. Representatives of the banking firm maintained that all property, with minor exceptions, were covered by the mortgage.

Net earnings of the Continental Can Co. for 1923 were \$4,837,480, against \$4,438,508 in the previous year. After providing for taxes, interest and other charges, net income amounted to \$3,767,730 against \$3,161,603 in 1922. After payment of dividends there remained a surplus of \$2,360,692 in 1923. Profit and loss surplus as of Dec. 31, last, was reported at \$5,182,522.

Net profits of the Gulf States Steel Co. for 1923 totaled \$1,576,521, after all charges and Federal taxes. This compares with \$958,207 in 1922.

The United States Radiator Co. reports net profits for the year ended Jan. 31 of \$1,450,947, after taxes and charges, equivalent to \$29.22 per share on 40,000 shares of common stock outstanding. The figures for 1922 were respectively, \$1,208,582 and \$29.96.

Net income of the Railway Steel Spring Co. for 1923, after charges, depreciation and Federal taxes, amounted to \$3,341,271, equivalent after preferred dividends to \$17.75 per share earned on \$13,500,000 in common stock outstanding. This compared with \$2,327,294 or \$10.23 per share earned in 1922. President F. F. Fitzpatrick stated in his report that operations of the wheel plants at several locations would be discontinued for purposes of economy and efforts will be concentrated at the tire plants. During the past year the plants at Pullman and Scranton were dismantled and sold, involving a loss in book value of \$309,053.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates	
	Per Lb.
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x 1/4 in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x 1/4 in., base	3.54c.
Steel plates, 1/4 in. and heavier	3.64c.

Merchant Steel	
	Per Lb.
Tire, 1 1/2 x 1/2 in. and larger	3.60c.
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger)	4.10c.
Toe-calk, 1/2 x 3/8 in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex.	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	75c. to 80c.

Sheets	
Blue Annealed	
	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black	
	Per Lb.
Nos. 18 to 20	4.55c. to 4.60c.
Nos. 22 and 24	4.70c. to 4.75c.
No. 26	4.75c. to 4.80c.
No. 28*	4.85c. to 4.90c.
No. 30	5.05c. to 5.10c.

Galvanized	
	Per Lb.
No. 14	4.95c. to 5.00c.
No. 16	5.10c. to 5.15c.
Nos. 18 and 20	5.25c. to 5.30c.
Nos. 22 and 24	5.40c. to 5.45c.
No. 26	5.55c. to 5.60c.
No. 28*	5.85c. to 5.90c.
No. 30	6.30c. to 6.35c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe	
Standard Steel	
	Per Lb.
1/2 in. Butt...	4.1
3/4 in. Butt...	4.6
1-3 in. Butt...	4.8
2 1/2-6 in. Lap...	4.4
7-8 in. Lap...	4.1
9-12 in. Lap...	3.4

Bolts and Screws	
Machine bolts, cut thread,	45 and 10 to 50 and 10 per cent off list
Carriage bolts, cut thread,	35 to 35 and 10 per cent off list
Coach screws	45 to 50 and 10 per cent off list
Wood screws, flat head iron,	75, 20, 10 and 7½ per cent off list

Steel Wire	
BASE PRICE* ON NO. 9 GAGE AND COARSER	
	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire	
BASE PRICE	
High brass sheet	17 1/2 c. to 18 1/2 c.
High brass wire	18 1/2 c. to 19 1/2 c.
Brass rods	15 1/2 c. to 16 1/2 c.
Brass tube, brazed	25 1/2 c. to 27 1/2 c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23 c. to 24 c.

Copper Sheets	
Sheet copper, hot rolled, 20 1/2 c. to 21c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates	
Bright Tin	
Grade	Grade
"AAA"	"A"
Charcoal	Charcoal
14x20	14x20
IC.. \$11.75	\$9.50
IX.. 13.25	11.50
IXX.. 14.50	12.50
IXXX.. 15.50	13.75
IXXXX.. 16.50	14.75

Terne Plates	
8 lb. coating, 14 x 20	
100 lb.	\$7.00 to \$8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin	
Straits pig	62c.
Bar	68c. to 70c.

Copper	
Lake ingot	15 1/2 c.
Electrolytic	15 c.
Casting	14 c.

Spelter and Sheet Zinc	
Western spelter	8c.
Sheet zinc, No. 9 base, casks	10 1/2 c. open 11 1/2 c.

Lead and Solder*	
American pig lead	11c. to 12c.
Bar lead	14c. to 15c.
Solder 1/2 and 1/2 guaranteed	40c.
No. 1 solder	38c.
Refined solder	34c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal	
Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony	
Asiatic	13c. to 14c.

Aluminum	
No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals	
The market is stronger and business more active. Dealers' buying prices are as follows:	

	Cents Per Lb.
Copper, heavy crucible	11.50
Copper, heavy wire	10.75
Copper, light bottoms	9.25
Brass, heavy	6.50
Brass, light	5.25
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	7.75
Lead, tea	6.25
Zinc	4.25
Cast aluminum	17.00
Sheet aluminum	17.00